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CONGENITAL EROSION AND SPLIT OF THE CERVIX UTERI.[1]

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I PRESENT this paper to the College of Physicians in order to direct attention to a condition of the cervix uteri in virgin and sterile women which I think is not by any means generally recognized, and to obtain from the members of the College some information from their own experience; for since my attention has been directed to this subject I have talked of it with several physicians in general practice, and a few of them had seen cases which puzzled them and which they thought belonged to the class of cases which I am about to describe—under the name Congenital Erosion and Split of the Cervix Uteri.

A few text-books on gynæcology refer to this congenital condition. The only papers upon the subject of which I have any knowledge are by Leopold in 1872 and by Fischel in 1880.

Fischel's paper is called a contribution to the morphology of the cervix uteri. As the explanation of the cases which have occurred in my own experience is furnished by this paper, I have added a short abstract of it which Dr. Lawrence S. Smith has very kindly made for me.

A CONTRIBUTION TO THE MORPHOLOGY OF THE CERVIX UTERI.

During the course of a series of investigations on the cervices of infants who had been stillborn or who had died soon after birth the author's attention was called to a condition which, so far as he knew, had never been described by any anatomist or gynæcologist that had undertaken the study of this part of the anatomy, namely, the occurrence of erosions. A short time before he had discovered by accident in the *Transactions of the Gesellschaft für Geburtshülfe* in Leipzig, July 15, 1872, a communication by Leopold stating that he had seen such an erosion of the cervix, and declaring it to be an anomaly in the newborn child heretofore unrecognized. In the debate

[1] Read before the College of Physicians of Philadelphia, February 5, 1896.

that followed Ahlfeld stated that circulatory congestion in the uterus and, apparently also, erosions of the mucous membrane were a frequent occurrence in asphyxiated infants. (*Archiv f. Gynäkol.* B. v. S. 162.)

From this short notice Fischel judges that neither Leopold nor Ahlfeld had ever subjected these erosions to a microscopic examination. He therefore publishes the investigations he made and also the conclusions he reached as a result of them.

"On twenty-eight cervices examined he found ten erosions of varying character and size; of these ten cervices, four were from fœtuses stillborn at term, two from infants a few days old, one from an infant fourteen days old, and three from infants three, four, and five weeks old, respectively. From the eighteen cases in which no erosion of any kind was found, five were stillborn at term, one a few days old, one nine weeks, one thirteen weeks, two eighteen months, and one two and one-half years old. The others came from fœtuses in the sixth, seventh, eighth, and ninth month of intrauterine life."

From these cases he found that the assertion of Ahlfeld (see above) had no value as far as cause and effect between asphyxia and erosion were concerned, since, of the five children born asphyxiated, none showed any erosion, while some did that died at varying periods after birth.

"The appearance which the erosion on the infantile cervix presents varies both in extent and in the form of the change. In most cases the external os forms a rather narrow transverse opening surrounded by a reddened, velvety area 3–4 mm. wide. In other cases the erosion extends onto the lateral surfaces of the cervix higher up than on the anterior and posterior aspects. In other cases still, and these bore the nearest resemblance to erosions in the adult, the change was limited to the under surfaces of the lips of the cervix as far as they came in contact with the posterior vaginal wall."

He points out that with the naked eye two forms of erosion may be distinguished: one with a satiny appearance, another of a rougher, more granular character, recognized as papillary. Microscopically, the papillæ, instead of being protected by an even covering of squamous epithelium, stand out separately in a more or less irregular arrangement. Covering the uneven surface thus formed is a single layer of cylindrical epithelial cells. On the ends of the papillæ the cylindrical form is replaced by a flatter, more cubical one, but everywhere the layer is single. There is no transition-form between squamous and cylindrical epithelium; but the hue of demarcation is always sharply defined, so that, for example, one side of a papilla may be lined with stratified squamous, the other with simple cylindrical epithelium. In many places compound glands, acinous in character, open into the depressions between the papillæ, and into these glands the simple columnar epithelium dips down. The mucosa itself is composed, as usual, of a connective tissue rich in nuclei.

To sum up, he concludes "that in almost 36 per cent. of newborn infants the vaginal surface of the cervix from the external os toward the vaginal fornices is covered more or less extensively with a mucous membrane, which, from the form of its epithelium, from its less papillary character, and from its possession of mucous glands and crypts, must be regarded as a direct continuation of the cervical mucous membrane.

"The dividing-line between the epithelium of the vagina and that of the uterus does not lie, as we are led to believe by all previous investigators, even the latest—Klotz, at the outermost end of the cervical canal, but may be situated even on the external vaginal surface of the cervix more or less high toward the vaginal fornices. For this condition I adopt the name congenital histological ectropium.

"This dividing-line between the two forms of epithelium lay, in the greater number of cases, within the cervical canal 2–3 mm. above the external os, and coincides with the external os in only a minority of cases."

The degree of development of glands in the cervical canal and on the outer surface of the cervix varies greatly in different individuals, as does also that of the palmar plicatæ within the cervix. In some these glands were

exceedingly well developed, but where the surface was covered with squamous epithelium he found no trace of glands of any kind.

He accounts for the formation of this ectropium by the theory that, after the formation of the uterus and vagina by the union of the lower segments of the ducts of Müller, which are lined with a simple columnar epithelium, a change begins at either end in the mucous membrane. In the uterus this change consists in a development of a glandular system, while in the vagina, beginning at the urogenital sinus, the columnar epithelium gradually changes into the squamous variety. At the termination of intrauterine life this change should have reached the external os, but owing to the varying rapidity with which it progresses in different individuals the point which it reaches varies, being sometimes higher, sometimes lower than normal. If the squamous epithelium reaches the cervix before any glandular development has taken place in its mucosa, no glandular openings are found on its surface, nor are any glandular formations found beneath it. If, however, the columnar epithelium has already begun to send down processes into the mucosa before the squamous metamorphosis overtakes it, these glandular structures persist and may develop further. This theory accounts for the histological ectropium, and also the presence of glands in the vaginal wall that Preuschen has described.

In regard to the connection between the histological ectropium and erosions and other pathological conditions he says: "It must be acknowledged as possible that erosions occur in adults when the individual has received a predisposition to it during the period of her development. It is, furthermore, to be conceded that this congenital histological ectropium of the cervix may be covered over by squamous epithelium, but still retain under this covering the glands and other attributes of a cervical mucous membrane. If now, through some inflammatory process, the tissues become congested and infiltrated with round-cells, the acquired superficial (squamous) epithelium will be shed, and the original columnar epithelium be brought to light, presenting the complete picture of a true œdematous or papillary erosion, a condition that differs from the normal cervical mucous membrane only in its greater succulence and in the richness in cellular elements.[1]

"However, I will admit that, as I have stated in my paper on erosions, the formation of the erosion may occur on a spot normally covered with squamous epithelium. But when I consider that even in adults the erosion never passes beyond the limits which we have recognized as originally those of the cervical mucous membrane (the highest boundary in my cases lay approximately midway between the external os and the fornix vaginæ), it becomes more and more evident to me that of women whose cervices are intact, those only will have erosions who are predisposed to them by this congenital condition which I have described."

He believes that the persistent and almost incurable forms of catarrh, for which Schröder has advised excision of the mucous membrane, are the result of a predisposition seated in the congenital hypertrophy of the "arbor vitæ" and its glands.

After a description of the normal cervix with its transversely oval os and its anterior and posterior lips united by the lateral commissures, he alludes to the injuries usually inflicted on it in labor and to the changes that these injuries produce in its form and appearance until the laceration ectropium described by Emmet is formed.

"I am now able," he says, "to show a photographic representation of the cervix of a newborn infant which presents an inferior degree of this condition. The separation of the lips does not extend all the way to the vaginal junction, but concerns only the lower two-fifths of the lateral corners. Nevertheless, the two lips deprived of their commissures gape open, the crest of one being 9 mm. from that of the other, exposing the cervical surface of both lips for a distance of 5-6 mm. This case shows that a peripheral notching of the cervix is not always a sign of a previous labor,

[1] Virchow's Archiv, B. 70, S. 116. "Ueber Cystenbildung in der Vagina."

but may represent a condition of the cervix in pregnant women whom we were forced to consider primiparæ not only through their own statements, but also from the condition of the external genitalia. This case is of great forensic importance in that the proof of a former labor can no longer be claimed for such a condition of the cervix."—*Archiv f. Gynäkologie*, 1880, Bd. xvi. S. 192.

It will be observed that there are two distinct conditions described by Fischel—a congenital erosion and a congenital split of the cervix, and the former is much the more frequent lesion, occurring to a greater or less degree in 36 per cent. of the infantile cervices which he examined.

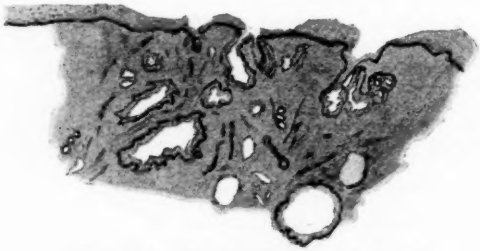
I have had no opportunity of studying the cervices of infants, but I have met one undoubted case of congenital split of the cervix in a virgin, and three cases of disease of the cervix in young women, which I think may be explained by the presence of the congenital erosion described by Fischel.

I have described the first case in detail, because in it the cervix was amputated and submitted to microscopic examination.

Case I.—N. S., white, aged twenty-five years, single. Menses began at fourteen years, occurred every twenty-eight days, and were of four days' duration. She had suffered for five years with profuse leucorrhœa, backache, and slight left ovarian pain. She was a well-developed, strong woman. Careful questioning and observation rendered it most probable that she was virtuous.

She had never had local gynæcological treatment

The ostium vaginæ was virginal. On the posterior margin there was a crescentic hymen, which was not, however, sufficient to prevent coitus. The vagina was small and virginal. The vaginal cervix was mushroom-shaped (see Plate, Fig. 1). The face of the cervix was flat, or very slightly evenly convex. The face of the cervix projected (like the top of a mushroom) on all sides beyond the upper portion which corresponded to the stalk of the mushroom. The face (see Plate, Fig. 2) of the cervix was round and about one and a half inches in diameter. In the figure



Microscopic section of vaginal cervix in Case I.

it is oval on account of the traction from the tenaculum. The external os was transverse—one-third of an inch broad. Upon the face of the cervix were several scattered patches of erosion.

The cervix was amputated and microscopical examination was made by Dr. Lawrence S. Smith.

The cervix was covered with squamous epithelium, except on the small patches of erosion, where cylindrical epithelium was present. Racemose glands (like the normal glands of the cervical canal) opened all over the face of the vaginal cervix, in front, behind, and to the sides of the external os. They were found as far as one half to three-quarters of an inch from the external os. These glands opened on the vaginal aspect of the cervix, where it was covered with squamous epithelium, and this epithelium extended to the ducts of the glands, which were lined with cylindrical epithelium. The vaginal cervix was, in fact, a glandular structure.

It will be remembered that normally no glands whatever open on the vaginal aspect of the cervix uteri.

The erosions which are usually seen in practice are those which accompany an inflammation of the mucous membrane of the body or neck of the uterus, and which are caused by the irritating discharge, and those erosions, by far the most frequent and pronounced, which are due to laceration of the cervix with eversion of the lips. In the cases of the first class there is no alteration in the general shape of the cervix. There are no glands discharging upon the vaginal aspect of the cervix, unless there be present a prolapse of the cervical mucous membrane.

In the cases of the second class, those due to laceration, the shape of the cervix is altered and there is a marked erosion, which is caused by the exposure of the normal mucous membrane of the cervical canal, and perhaps by some proliferation from irritation of the cellular and glandular elements of this mucous membrane.

The differences between the condition found in the case which I have described and that present in a case of bilateral laceration with ectropion of the cervix uteri may be stated as follows:

In the laceration there is a history of pregnancy. The face of the cervix is oval, the antero-posterior axis being the longer. The angles of laceration are marked either by a depression on each side of the apparent external os or by a palpable plug of cicatricial tissue. The ectropion is antero-posterior; there is no lateral ectropion.

In the condition in Case I. there had been no pregnancy. The face of the cervix was round, plane, or very slightly uniformly convex. There was no indication of any angle of laceration, macroscopically or microscopically.

The cervix is mushroom shaped. The ectropion is lateral as well as antero posterior.

It seems probable that the condition which I have described is distinct and congenital, and is due to the development upon the vaginal aspect of the cervix of those structures which are normally confined to the cervical canal.

It will be remembered that Fischel found such a condition in 36 per

cent. of the infants examined by him; but most of these erosions were slight in extent and would certainly have given no trouble if they had persisted to adult years. It is probable that many of the slight erosions not caused by cervical catarrh, which are found in young girls, may be explained by Fischel's theory. Such erosions are common in cases of congenital anteflexion, and it is in such cases of imperfect development of the uterus that one should expect to find imperfection in the development of the external os.

When, however, this congenital erosion is present and persists over the greater part of the vaginal cervix, as in one of Fischel's cases, the condition which I have described may be produced, and symptoms will be caused by it which are similar to those following bilateral laceration of the cervix with ectropion.

The shape of the cervix in the case which I have reported is peculiar. If the condition is, as I have attempted to show, caused by the congenital growth of the mucous membrane of the cervical canal over the vaginal aspect of the cervix, or, in other words, by a defect in the development of the external os uteri, one would expect to find a change in the normal growth and hence in the adult shape of the cervix.

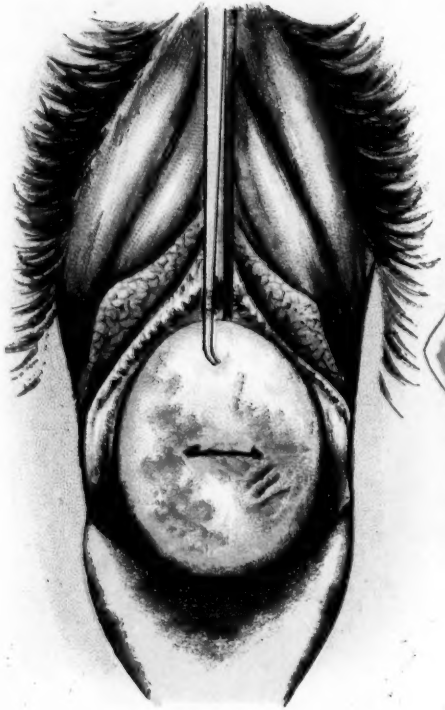
I have observed a similar condition of the cervix uteri in two other cases—one a married woman of thirty years who had never conceived, and the other a probable virgin of twenty-one years. As in these cases the cervix was not amputated, I was unable to make a microscopical examination to prove its glandular character; the macroscopical features, however, were similar to those of the case already described.

The proper treatment for such cases is amputation of the cervix. Complete relief from all symptoms followed this operation in the case here reported. In one of the other cases I performed an operation similar to trachelorrhaphy, cutting out the lateral portions of the cervix, and attempted in this way to restore the normal shape of the cervix; but the woman derived little or no benefit from it.

Case II.—C. W., aged seventeen years, a modest school-girl of respectable parents. Careful questioning of her mother, father, and family physician rendered it extremely probable that the girl was virtuous. She had never had any local treatment of the uterus. She came to the University Hospital on account of painful and frequent urination. She was etherized and an endoscopic examination of the bladder was made. The appearance of the interior of the bladder suggested tubercular cystitis, though the disease subsequently yielded to local treatment.

While the girl was under ether an examination was made of the vagina and uterus. The ostium vaginæ was very small, and there was a well formed annular hymen, which with difficulty admitted the little finger. Introduction of the index-finger ruptured the hymen. There was a bilateral split of the cervix which was most marked on the left side. The depth of the split on the left side was three-eighths of an inch. There was no ectropion. There was an erosion surrounding the

Fig. 1.



Congenital erosion, Case I.

Fig. 2.

Congenital erosion, Case I.

Fig. 3.

Congenital split of the cervix, Case II.

os. The uterus was in the second degree of retroversion. The integrity of the hymen was not regarded, because it was thought that the retro version would require correction. There was no leucorrhœa.

The appearance of the vaginal cervix is well shown in Fig. 3 of the Plate, which was made from life. The macroscopical appearance of the cervix is in all respects similar to that seen after laceration from abortion, miscarriage, or labor; though the case reported was an undoubted case of congenital split of the cervix.

As pointed out by Fischel, the importance of such cases is very great from a medico legal point of view.

A STUDY OF THREE CASES OF TUMOR OF THE BRAIN IN WHICH OPERATION WAS PERFORMED—ONE RECOVERY, TWO DEATHS.

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WITH REMARKS

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Notwithstanding the brilliant results obtained in single cases of tumor of the brain operated upon with success, the general results of surgical interference in this class of cases, it must be admitted, are not as encouraging as we would desire them to be, especially when we compare them with the splendid showing of the operative treatment of certain pyogenic diseases of the brain.[1]

From *Chipault's* very complete table in his recent admirable work on the *Surgery of the Nervous System*, I find that 63 of 123 cases of brain-tumor operated upon died from the effects of the operation (51 per cent.). Forty-nine cases in which a tumor was removed recovered from the operation—it is impossible, however, to state exactly how many of these cases were cured of their disease, or even greatly benefited by the operation, which is the salient point of the whole subject.

The difficulties which beset the successful surgical treatment of tumors of the brain are of threefold character:

[1] See Macewen: Pyogenic Infectious Diseases of the Brain and Spinal Cord, 1893.

1. The difficulties of diagnosis, both of the presence of a new growth and of its exact position in the cranial cavity.
2. The inaccessibility of the new growth.
3. The excessive size of the latter.

Some of these difficulties are insurmountable, notably those offered by the inaccessible location of a tumor, although the limits of "accessibility" vary with the boldness and genius of the surgeon; others again, especially the difficulties of a diagnosis, we neurologists may hope to surmount more and more, as our experience broadens and our knowledge of cerebral anatomy, physiology, and morbid manifestations grows. This purpose, I believe, is served to some extent by a careful study of the clinical history and pathological bearings of every case of brain-tumor we meet with, and especially of every case operated upon, whether with or without success. In this spirit the following study of three cases of brain-tumor I have had operated upon during the last two years is offered for your consideration:

CASE I. *Glio-sarcoma, the size of an almond, developing two years and ten months after the successful removal of a cystic tumor of the left motor area; successful localization and excision; recovery.*—This is the case of cystic tumor of the brain presented to the Neurological Society of New York in January, 1893, and reported in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES for June, 1893, p. 620. The history of the case as published at the time is briefly recapitulated:

K. H., born in 1866, has been always well prior to her present trouble; no specific nor hereditary taint, no history of injury to the head nor of previous convulsions. In October, 1891, while talking quietly with her husband, the patient suddenly felt the thumb and forefinger of her right hand twitch; the convulsive twitching spread rapidly up the arm to the shoulder and face, leading finally, within a few moments, to a general seizure with loss of consciousness, cyanosis, frothing at the mouth, and general clonic-tonic convulsions. A second similar spell occurred seven weeks later, a third two weeks thereafter, early in December. On December 22d the patient had three seizures, one of them with involuntary micturition. On December 23d she was seen for the first time at the Mt. Sinai Hospital Dispensary. Suspicion of a localized cerebral lesion was immediately aroused; but as she showed absolutely no other symptoms she was put upon bromides and kept under observation. She had spells on January 5th and 13th, three on January 15th, and one on January 19th, after which she had no more general convulsions at all; convulsive twitchings confined to the right hand and forearm, and always beginning in the thumb and index-finger, occurred, however, almost daily.

In February a marked paresis of the right hand developed, which increased slowly in the course of the next few weeks. There never was any headache, vertigo, nausea, drowsiness, or impairment of the memory; there was no tender cranial point. Dr. Koller examined the patient's eyes a number of times and never could discover any sign of beginning papillitis. The deep reflexes were lively on both sides, especially so in the right arm. Localized convulsive twitchings occurred almost daily; one seizure occurred at the dispensary and was witnessed by me.

The diagnosis of an organic lesion, probably a tumor, in the left anterior central convolution at the juncture of the lower and middle thirds, the motor centre for the thumb and forefinger, was made. Although there were but two symptoms present to base a diagnosis upon, they were of great significance; the symptoms of cortical irritation, with subsequent loss of power in the very group of muscles affected by the convulsive twitchings, left no doubt as to the presence of an organic lesion of a progressive and destructive character. The utter failure of thorough treatment with mercury and iodides (300 grains a day) excluded syphilis, nor was there anything to favor the diagnosis of an abscess. In spite of the absence of all general cerebral symptoms the diagnosis of tumor was, therefore, made by exclusion.

The patient was operated upon by Dr. Gerster at the Mt. Sinai Hospital on June 25, 1892. A subcortical cystic tumor was found at the point designated above and evacuated, an ounce of straw-colored serous fluid escaping. Dr. Gerster introduced his little finger into the cyst about one and a half inches and found its walls perfectly smooth. A small layer of gray matter was removed from the exposed centre. The removal of the cyst-wall was considered inadvisable for surgical reasons. The dura was not adherent to the brain at any point.

The patient made a good recovery, gradually regaining the use of her right hand and arm, which were almost entirely paralyzed after the operation. Four weeks later slight convulsive twitchings occurred in the right hand, arm, and face. On August 7th the scalp-wound was reopened, adhesions between the flap of skin and the dura were separated, and a flexible gold plate was inserted between the two to prevent any recurrence of adhesions and to serve as a protection to the brain, the plate projecting slightly beneath the ledges of the opening in the skull.

By the end of October the patient was able to write, sew, and do light housework; before the operation she had not been able to use her hand at all any more, so there can be no doubt that she was benefited by the operation, especially when we bear in mind that the paralysis was steadily progressive at the time.

The most noticeable feature in the case was the *absolute absence* of general cerebral symptoms—this was readily accounted for at the operation by the absence of any increase of the intracranial pressure.

In discussing the pathology of the evacuated cyst the conclusion was arrived at that a *glioma or sarco-glioma was, in all probability, at the bottom of the trouble; the fear of a further growth of the neoplasm presumably left in the walls of the cyst was expressed and the desirability of removing the entire cyst-wall emphasized* (p. 624). The subsequent history of this case, which has been under my care ever since, being seen every two to four weeks during this time, is as follows:

December 22, 1892, six months after operation, general epileptic seizure beginning in the right arm. During the next four months twitchings, confined to the right hand or hand and face, occurred at irregular intervals, generally not oftener than every two or three weeks. After each seizure the hand is weak for a few hours. The patient was kept during this time on 2 drachms to 3 drachms of bromide of potash a day. The deep reflexes on the right side of the body are greatly increased; tapping the tibia, for instance, elicits a reflex contraction in the adductors of the thigh.

April 17, 1893, I find noted: For the last four weeks no twitchings have occurred at all; the patient feels very well. Dynamometer-test: R. 30—L. 45.

December 19. The patient has had twitchings every three or four weeks of late. To-day a general seizure occurred, the second one since the operation; the spell began locally like all the previous ones.

January 20, 1894. Third general seizure.

21*st*, 22*d*, 23*d*, and 24*th*. Local seizures, sometimes two or three times a day. No headache, vertigo, nausea, no sign of papillitis (Dr. Koller). Dynamometer-test: R. 30—L. 45.

February 26*th*. Fourth general seizure.

During the next twelve months the patient was examined at regular intervals, but no objective change in her condition was ever found. The twitchings grew more and more frequent and finally occurred almost every day. In all she has had three more general convulsions during this time.

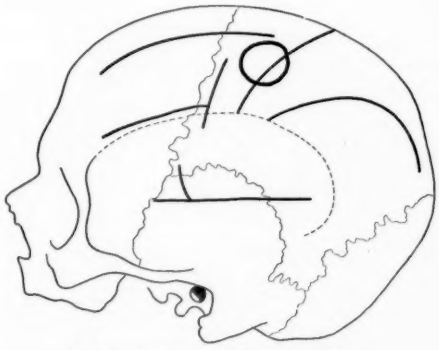
March 1, 1895. *For the last ten days the patient has been suffering from severe headache*—the first headache, she declares, she has ever had in her life; the headache is general in character, not more severe on either side. There is no nausea, vomiting, or vertigo. Bowels have been regular; the urine is free from albumin. The strength of the right hand has diminished perceptibly, the dynamometer showing only 20 as to 32 found two months before. There is no disturbance of sensation beyond a feeling of numbness, which occasionally precedes or follows a localized seizure. Speech is perfectly free. The deep reflexes are as lively as ever on the right side. Dr. Koller, who had examined the patient every few months, finds *her disks for the first time slightly but distinctly cloudy and swollen.*

15*th*. The same ophthalmoscopic condition reported by Dr. Koller; there is now also some dilatation of the veins. The headache has been controlled by gr. x to gr. xv phenacetin a day. Almost every night twitchings in the right hand. The patient cannot flex the small finger of the right hand any more; no other absolute paralysis.

The diagnosis was made of a recurrence of the growth, probably a glioma, at the old seat of the lesion or of a refilling of the evacuated cyst, the diagnosis being based upon the development of headache, which had never been present before, upon the beginning papillitis, and upon the increasing weakness in the right hand. Early operative interference was strongly urged, and on April 8th, two years and ten months after the first operation, the patient was operated upon by Dr. Gerster at the German Hospital. The old flap was raised and immediately beneath it the gold plate was found as bright and untarnished as three years ago. A perfectly smooth membrane, resembling a synovial membrane, had formed on the inner surface of the scalp from the contact with the gold plate. The latter was raised and removed without the slightest difficulty; the dura beneath was of good color, and bulged but little. An aspirating-needle was introduced in four or five directions without any result. The dura was then opened by a crucial incision and was found to be adherent to the brain-substance beneath. Inspection of the exposed brain revealed the presence of a small maroon-colored mass toward the upper margin of the opening in the skull; the latter was enlarged with the aid of the rongeur, exposing the limits of the new growth on all sides. In excising the neoplasm it was found to extend quite a distance vertically into the

substance of the brain, being shaped like a cone, with its base on the surface and its apex buried in the substance of the brain. The conical mass, which was hardly larger than a good-sized almond, was removed in two or three pieces from above down and a ring of the surrounding brain-tissue about half an inch wide (on each side) excised, as it was apparent that we had to deal with an infiltrating neoplasm. The adherent piece of dura was also carefully excised. The hemorrhage, which was not profuse, was readily controlled by compression with gauze. The dura and scalp-wound were closed by sutures and the wound dressed. The gold plate was not reinserted on account of a likelihood of a recurrence of the tumor at a future date.

FIG. 1.



Showing the opening in the skull in Case I.

April 9th. Patient has stood the operation well. The right hand and arm are paralyzed; the patient complains of pain in the paralyzed limb. Headache and some difficulty in speech. No temperature.

10*th.* Some headache. Condition unchanged.

12*th.* The patient is able to flex and raise the hand in the wrist-joint somewhat.

13*th.* She is able to move the third and fourth fingers slightly. The sensibility to the lightest touch is unimpaired in the hand and forearm. The sense of position of the fingers and arm very uncertain.

15*th.* Dressing changed. Three severe general seizures occurred after the change of dressings, all of them beginning in the paralyzed arm.

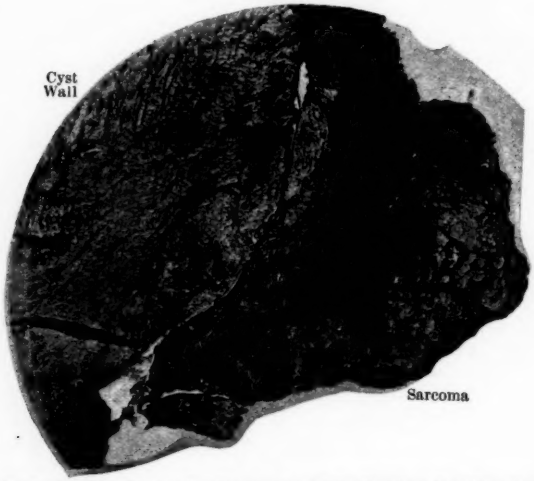
20*th.* The power in the paralyzed muscles is slowly returning; with the exception of the thumb and index-finger the patient can move all of her fingers, with great effort only, to be sure.

May 9th. There is marked improvement in the condition of the arm; the latter can be raised above the head, the patient can shake hands, and has some, though very slight, use of all her joints except those of the thumb and index-finger, which remain paralyzed. The index-finger can be extended and flexed in the metacarpo-phalangeal joint, but not in the two interphalangeal joints. The general condition of the patient is good;

there has been no headache nor any further sign of any convulsive seizure thus far.[1]

The new growth and the surrounding brain-tissue were hardened in alcohol, imbedded in celloidin, and subjected to a careful microscopic examination, which revealed very instructive and interesting morbid conditions. The excised cone was cut in transverse sections and was found to consist in the main of the wall of the old cyst; sections from its apex simply show the very thick cyst-wall consisting of striated fibrous tissue with occasional spindle-shaped cellular elements, the microscopic picture greatly resembling that of the dura mater. A recent hemorrhage in the

FIG. 2.



Photomicrograph × 25, showing the sarcoma originating from the old cyst-wall.

cyst can be readily demonstrated. As the sections approach the base of the cone—*i. e.*, the surface of the brain—a point is reached at which a sarcomatous growth consisting mainly of spindle-cells can be seen originating from a point of the old cyst-wall (Fig. 2); the remaining cyst-wall

[1] A few words concerning the subsequent history of K. H. (Case I.) may be of interest. The patient has been in perfect general health ever since the last operation (one year ago), and shows thus far no symptoms of any further growth of the neoplasm. Since the convulsions which were brought on by the change of dressing after the operation, she has not had the slightest twitching nor sign of any epileptic seizure of any kind, in which respect she is much better off than after the first operation. I attribute the absence of the twitchings to the thorough excision of the affected area, and perhaps, too, to the liberal opening in her skull. The patient has recovered the use of her paralyzed arm to a considerable extent, the thumb and index-finger alone remaining powerless. Cutaneous sensibility is perfect, but there is a marked insufficiency of the muscular sense in the right hand; only comparatively extensive movements in the finger and wrist-joints are appreciated. This dissociated disturbance of the muscular sense in a distinctly cortical lesion affecting the corresponding motor area is of interest. —L. S., March, 1896.

at this level shows recent hemorrhages and two or three areas of small-cell infiltration; otherwise no indication of any active morbid process. In many sections the new growth, not larger than a lentil, can be seen attached to the old cyst-wall with the naked eye. A closer examination of the growth shows it to consist mainly of spindle-shaped sarcoma-elements, partly of glioma-cells and partly of angio-sarcomatous formations.

The microscopic examination of the surrounding brain-tissue was a revelation: at the point where the new growth attached to the cyst-wall was in contact with the brain-tissue, the latter is seen to consist for the extent of a few millimetres of a glio-angio-fibro- and melano-sarcoma, the character of the neoplasm varying at different points. The neoplasm is nowhere sharply separated from the brain-tissue proper; the latter is infiltrated by the elements of the new growth; in some sections two or three islets of spindle-cells, containing not more than a dozen cells apiece, can be seen in the midst of healthy brain-substance, indicating a beginning metastasis.

The malignancy of the entire process is very evident and the recurrence of the growth only a question of time; taking its malignant character and its small extent into consideration, we may conclude, I believe, that its development from the old cyst-wall was of recent date, perhaps not older than a few months, which would agree also with the clinical history.

The conclusions I should like to draw from this case may be formulated as follows:

1. A new growth may be present in the brain without causing any general cerebral symptoms whatsoever. In order to make an early diagnosis of a new growth it is well, therefore, to be guided by the symptoms present rather than by the absence of other customary symptoms.

2. A cystic tumor of the brain not of parasitic origin is not so innocent in character as many would believe.

3. The simple evacuation of such a cyst when found is not sufficient; if it is surgically possible, the wall and the surrounding brain-tissue should be excised in order to prevent a future growth of the malignant elements left in the wall of the cyst.

4. If the immediate excision is not possible, *it would be advisable to open the wound a few months later and attempt to excise the collapsed cyst-wall, which is compressed into a small space by the general cerebral pressure, in the same way in which an abscess-cavity is quickly obliterated after evacuation.* In our case I do not doubt that the secondary excision could have been easily done at any time during the three years which elapsed after the first operation.

CASE II. *Glio-sarcoma of the right cerebellar hemisphere; successful localization; operation; death; autopsy.*—H. S., aged thirty-three years,

born in Russia, was first seen on July 31st, at the Mt. Sinai Hospital Dispensary, being referred to my department by the kindness of Dr. Koller, whom he consulted on account of failing vision.

Previous history. The patient has taken liquor moderately; never suffered any injury to his head. Acquired a chancre in 1884; does not know of any secondary manifestations. Has been married six years and has three healthy children.

His present trouble began two years ago with intense headache, vertigo, and occasional vomiting. The giddiness was at times so severe that he would fall to the ground, without losing consciousness, however. About nine or ten months ago he noticed that his eyesight was failing him, and that he was growing deaf in his right ear. His gait was at times so unsteady that he was suspected of being intoxicated. Dr. Koller, whom he consulted, found well-marked choked disks in both eyes and amblyopia of the right eye, so that the patient could distinguish fingers only in the right lower quadrant of the visual field. The vision in the left eye was diminished.

Present condition, July 31st: Tall, well-developed man, of good intelligence. Examination of the head revealed no area especially tender to percussion; the left frontal region was somewhat more sensitive to the blows of the percussion-hammer than other parts of the head. The pupils are dilated and respond sluggishly to light, the right pupil more so than the left. The movements of the right eye are not so perfect as those of the left; the eyeball can be moved in all directions, but extreme positions are not attained, which Dr. Koller ascribes to the loss of vision with its loss of impulse for energetic effort.

The muscles of the face show no paresis whatsoever, the eyes are closed tightly, the eyebrows raised, the cheeks puffed up, the lips puckered, etc., without any noticeable difference between the two sides. The tongue is protruded straight and moved freely. Sensation is not disturbed in the face; the sense of taste is perfectly normal. The right ear is absolutely deaf to air- and bone-conduction. There is no impairment of hearing in the left ear. Pressure of the right hand 76, left 55. There is no muscular weakness nor disturbance of sensation in any part of the body; the sense of position is reliable in all the limbs. The knee-joint is equally lively on both sides; the deep reflexes are easily elicited in both arms. Plantar and cremasteric reflex prompt, abdominal reflex less so. No Romberg. The patient's gait varies: at times he walks without any indication of unsteadiness; at other times there is very marked staggering, the gait resembling that of an intoxicated man, with a tendency to fall to the *right*.

August 2d. The examination was completed by careful electrical tests of the seventh, eighth, and twelfth cerebral nerves.

Examination of the facial nerves shows *partial reaction of degeneration on the right side.*

	Right facial nerve.	Left facial nerve.
Faradic current (coils separated) .	120 mm.	120 mm.
Galvanic current	2.5 CaCC.	2.5 CaCC.
Muscles of lower lip:		
Faradic current (coils separated) .	80 mm.	100 mm.
Galvanic current	1.5 ma. AnCC. 2.5 ma. CaCC.	3 ma. CaCC.

Contractions sluggish.

We have, therefore, increased galvanic excitability, ACC > CCC, and sluggish contractions in the muscles; no change of excitability in the nerve-trunk; partial reaction of degeneration.

Auditory nerves: In the right (deaf) ear no response at all is obtainable; in the left ear hyperæsthesia (hyper-excitability) with reversal of the normal formula is found:

AnC Sd (sound) at 0.5 ma.
AnC Sd > CaC Sd.
AnC Sd (0.5 ma.) > AnO Sd (1 ma.).

When the positive pole is applied and the current (0.5 ma.) is closed the patient says he hears loud ringing—when the negative pole is applied no sound at all is heard with the same strength of current; when 1 ma. is used loud ringing is heard upon AnC and whistling upon CaC and AnO, though less loud. With 2 ma. the ringing after AnC continues as long as the current is turned on.

N. hypoglossus: The tongue shows no change in the electrical reactions.

Diagnosis. The choked disks, the headache, vertigo, and nausea indicated the presence of a tumor of the brain; the occasional staggering, the spells of intense vertigo, the deafness in the right ear, and the partial R. D. on the right side of the face established the diagnosis of a tumor of the right hemisphere of the cerebellum, compressing the seventh and eighth nerves prior to or at their common entrance at the internal auditory meatus. The exclusive involvement of the seventh and eighth nerves at the base of the brain justified the conclusion that the new growth pressed directly and not indirectly upon them, and that it was situated, therefore, in the ventro-cephalic part of the right cerebellar lobe in the neighborhood of the internal auditory meatus.

As to the character of the tumor, the history of chancre given by the patient had to be taken into consideration, and the possibility of the presence of a gumma could not be excluded. The marked variations in the intensity of the patient's symptoms, of the headache, vertigo, and staggering indicated, however, rather the presence of a vascular growth, a glioma or a sarcoma, and the subsequent complete failure of specific treatment to relieve the condition in any way confirmed this view.

Subsequent course. The patient was put from the very first upon a course of mercurial inunction, 4 grammes a day, and iodide of potash was pushed at the same time rapidly to 200 grains a day.

August 3d. Vision in the right eye entirely lost. The patient was seen walking on the street staggering considerably, with a distinct inclination to fall toward the right side.

8th. The patient was made the subject of a clinical lecture at the New York Polyclinic; the partial reaction of degeneration on the right half of the face and the changed electrical response from the left auditory nerve were easily demonstrated to the students. There was no sign of any weakness in the facial muscles; the patient held a pencil, for instance, tightly between his lips on the right side quite as well as on the left, although the labial muscles showed the R. D. most markedly.

22d. The patient was admitted to the Mt. Sinai Hospital, where he was again subjected to a thorough course of specific treatment without any effect upon the course of the disease at all. Dr. Sachs saw the case with me at the hospital, and agreed with my diagnosis upon my demonstrating to him the changed electrical reactions on the right side of the face.

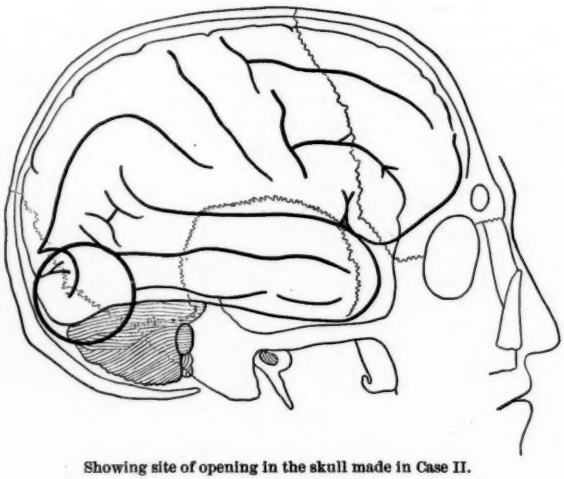
September 10*th*. The patient's condition is growing slowly worse; the staggering gait is now more constantly present; the headache is intense; the vision of the left eye is diminishing. The patient is as if "dazed," and shows more distinctly the air of absent-mindedness so frequently characteristic of brain-tumor.

17*th*. There is a slight but distinct paresis of the muscles of the right side of the face; it is most evident when the patient shows his teeth or puffs up his cheeks. The corneal reflex of the right eye is diminished as compared with the left; the cornea can be touched before the reflex occurs. There is no vomiting, but much headache and vertigo.

October 1*st*. The facial paresis is more marked. Tactile sensibility less acute on the right side of the face than on the left. The patient has some difficulty in swallowing.

The sensory symptoms indicate pressure upon the trigeminal nerve; the difficulty in swallowing shows pressure upon the glosso-pharyngeal nerve.

FIG. 3.

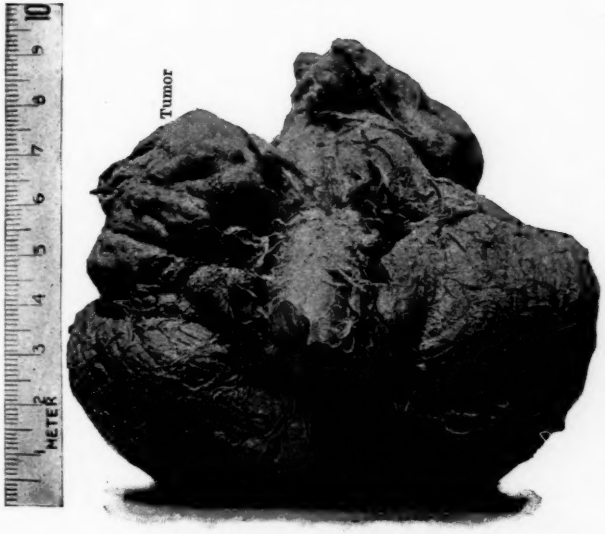


Showing site of opening in the skull made in Case II.

The patient's condition was so miserable that it was agreed to make an effort to relieve him by surgical means. After a number of experiments on the cadaver, which demonstrated the possibility of reaching the anterior portion of the base of the cerebellum from above by way of the tentorium, Dr. Gerster proposed entering the skull at the point indicated in Fig. 3, to raise the occipital lobe, if possible, sufficiently to enter the posterior cranial fossa by an opening through the tentorium and to excise and remove the tumor, if it could be reached; otherwise at least to relieve the intracranial pressure by a liberal opening in the skull. The patient was so miserable that he willingly consented to any effort to relieve his sufferings. On October 27th the operation was performed, no change of any consequence occurring meanwhile in the patient's condition. With the gouge, mallet, and rongeur a large opening, three and a half by two and a half inches, was made in the skull backward and

partly upward of the mastoid process; the bone was carefully removed from the lateral sinus with the end of the rongeur. The dura was of healthy color and bulged forth immediately very strongly from the cranial opening; its resistance to the pressure of a finger was like that of a board. As soon as the dura was opened by a crucial incision the brain-substance protruded and could not be held back. Dr. Gerster succeeded in raising the occipital lobe sufficiently to see the tentorium, which was seen and felt to be under great pressure from below. An incision was made in the tentorium to relieve the pressure in the posterior fossa, but it was not possible to complete the operation on account of the tremendous intracranial pressure, which rendered it impossible to raise the occipital lobe sufficiently to allow any further manipulating within the skull. The large hernia cerebri had to be ablated; the wound was packed and dressed. The hemorrhage during the entire operation was easily controlled.

FIG. 4.



Photograph of cerebellar tumor.

The patient rallied well from the operation and complained less of headache the next few days.[1] His temperature was normal. During a change of dressings, however, the wound was infected and meningitis developed, the temperature ranging between 100.5° and 104°; the patient became comatose and died November 10th, two weeks after the operation, the temperature rising to 107° just before death.

Autopsy, November 10th, ten hours after death, by Dr. F. S. Mandelbaum, Pathologist to the Mt. Sinai Hospital. Corpse emaciated; consid-

[1] The bedside history of the case, covering the time after the operation up to death, has been mislaid in the hospital, unfortunately, and the data given are based upon my recollection of the case.

erable rigor mortis. The surgical dressing was removed and the brain-substance beneath lying in the opening of the skull found covered with thick yellow pus. Opening in the skull three and one-half by two and one-half inches by measurement. General purulent pachymeningitis. Upon opening the posterior fossa the right cerebellar hemisphere bulges very strongly; the pial veins of the cerebellum, medulla, and pons engorged. Upon raising the brain a tumor of the size of a small apricot, involving the anterior half of the right cerebellar hemisphere, is found in the very position in which the symptoms during life had pointed. The tumor measures 4.5 x 4.0 x 4.0 cm.; it is not encapsulated, but it is distinctly separated from the surrounding cerebellar tissue in such a way that it could evidently be readily enucleated. The right half of the pons is considerably indented by the new growth; the right seventh and eighth nerves are flattened and thinner than the corresponding nerves on the left side; adhesions between the tumor and the dura were found in the neighborhood of the internal auditory meatus. The lateral ventricles are dilated; the whole brain is very succulent. The microscopic examinations (by Dr. Mandelbaum) showed the new growth to be a glio-sarcoma, in which the sarcomatous elements predominate. Sections from the facial nerve showed advanced degeneration of the myelin-sheaths, the axis-cylinders being but partially destroyed.

The points of interest in this case may be summed up as follows:

1. The occurrence of R. D. in the right facial nerve preceding the development of the first signs of paresis by almost two months, making an early diagnosis of the exact seat of the tumor possible. I have been able to find no other case of the kind in literature in which changed electrical reactions in any of the cerebral nerves were found preceding the onset of paralysis.

2. The hyperæsthesia (increased excitability) and the reversal of the normal formula for the electrical responses from the left auditory nerve, which I am inclined to ascribe to the greatly increased pressure in the posterior fossa. It is difficult to say whether the changed reactions are due to the effect of pressure upon the auditory nerve itself or upon the lymphatic conduit connecting the labyrinth with the posterior fossa. In the latter case the changed reactions would indicate a condition resembling that of the choked disk (*Stauungs-papille*), a condition of lymphatic stasis in the labyrinth (*Stauungs-labyrinth*). Under all circumstances I believe it will be worth our while to examine the auditory nerves in cases of brain-tumor, especially in those in which a tumor in the posterior fossa is suspected; the presence of changed electrical reactions in one or both of the auditory nerves I would consider a valuable aid in the diagnosis.[1]

As to the operation performed, the tremendous intracranial pressure rendered all manipulations within the skull futile. If it were to be attempted over again, I should recommend preliminary tapping of the

[1] It must be remembered that these tests require a certain amount of intelligence on the part of the patient, for we must rely upon his power of perception of sounds.

lumbar region according to Quincke's method, in order to relieve the intracranial pressure to some degree; in the second place, it might be well to open the skull and dura in separate sittings, tapping the lateral ventricles before opening the dura. By taking these measures we might hope that the method, which is possible on the cadaver, would be more successful than it was in our case. The location of the tumor, I should like to add, in the ventro-cephalad part of the cerebellar hemisphere seems to be favored by new growths; Oppenheim,[1] Starr,[2] and Wollenberg[3] have observed cerebellar tumors at the very same point.

Remarks by Dr. Gerster.

The problem to be solved in the instance recorded in this history being the removal of a tumor probably located on the ventral surface of the cerebellum, a preliminary study of the topographical relations was made on the cadaver. The cerebellum can be approached and exposed by two routes. The one hitherto employed was a direct exposure of the cerebellum through the cranium composing the posterior cranial fossa. In tumors on or near the posterior aspect of the cerebellum this approach is the best, though the vicinity of the great foramen below, and of the transverse sinus above, serves to limit the size of the aperture. These limits and the dissection of the attachments of the posterior cervical muscles render the field of the operation deep and narrow, and the surgeon's manipulations will necessarily be cramped by the depth of the wound as well as by lack of space, especially when the tumor be large and deep-seated.

It was thought that if the cranium were opened by a generous fenestrum cut out just above the transverse sinus, exposing the upper surface of the tentorium, a tumor situated near or on its ventral surface could be attacked more easily. On the cadavers at my disposal, this route was found to be very feasible, and the occipital lobe being raised from the tentorium ready access was gained to any portion of the cerebellum.

Accordingly, I decided to attempt the removal of the tumor by the route just described.

The exposure of the transverse sinus from above was found very easy, the landmarks guiding the surgeon being unmistakable. The external occipital protuberance and the semicircular line corresponding to the transverse sinus, the craniotomic aperture should be laid just above this ridge. As soon as the occipital lobe was exposed, the opening could be safely enlarged down to the very edge of the sinus. But here we encountered an element of danger and difficulty not met with on the cadaver, and that was the enormous intracranial pressure.

[1] Oppenheim: Nervenkrankheiten, p. 541.
[2] Starr: Brain Surgery, p. 241.
[3] Wollenberg: Arch. für Psych., xxi. p. 791.

The cerebrum was readily raised from the tentorium and was held up with a broad spatula, and the tentorium was opened by means of a large crucial incision, through which the cerebellar tissue at once bulged out and protruded, so as to render further steps risky and uncertain. It would have been necessary to remove a considerable portion of the cerebellum itself before an extirpation of the growth could have been even attempted. This and the considerable hemorrhage issuing from the much-distended vessels—mostly capillaries—of cerebellum, tentorium, and occipital lobe, finally and principally the crowding forward of the cerebellum filling up the narrow space of the wound, induced me to give up the attempt, which, though ending in removal of the growth, might also cause death on the operating-table.

The wound was drained by a large tampon of iodoform-gauze, which was brought out through the external wound, and the usual dressings were applied.

Subsequently we ascertained that the size of the tumor was so great that it would have been utterly impossible to remove it safely even through the largest possible craniotomy wound.

Though the plan pursued in this case was not successful, it may be stated, nevertheless, that the route here outlined is feasible, and cannot but be useful and successful in cases in which the tumor occupies the central parts of the cerebellum or the tentorial surface, and where its size does not preclude every possibility of safe operating.

CASE III. *Spindle-cell sarcoma of the left arm, face, and speech centres; successful localization; operation; death; autopsy.*—H. B., aged fifty years, peddler, native of Russia, was first seen March 17, 1894, at the Mt. Sinai Hospital Dispensary. The patient claimed to have been well till five months previously (October, 1893), when he was suddenly taken with the first spell of the character about to be described.

The patient has been married twenty-four years; he denies specific infection; does not remember having ever suffered any injury to his head. His wife states that she has borne him ten children, of which four were stillborn, two died when three and eight months old; four are living and well; the stillborn children were covered with an eruption and were born prematurely; all of the living children were covered with a rash at birth or developed one soon after. Mrs. B. aborted five times besides. A careful examination of the patient himself revealed no traces of syphilis. The youngest daughter has Hutchinson teeth. The examination of the patient's wife showed the presence of Argyll-Robertson pupils, with myosis and inequality of the two pupils, and the absence of both knee-jerks — in other words, she is suffering from locomotor ataxia, although she is entirely unaware of her condition. These points are emphasized because they bear strong evidence of a specific taint in the patient's family, and therefore presumably in the patient himself in spite of his assurance to the contrary.

In October, 1893, while enjoying perfect health, the patient was suddenly taken with a seizure in which his head and mouth were drawn violently to the right; the right arm jerked somewhat, the leg not at

all. The jerking lasted about five minutes, the patient remaining perfectly conscious. There was neither headache nor drowsiness after the spell. In all the patient has had up to date eight similar attacks, the last of which I witnessed at the dispensary the very first day I saw him. The seizure began with clonic contractions in the muscles of the right half of the face, and the head was drawn to the right side; after a few moments the right arm and leg began jerking, mainly in the shoulder- and hip-joints. The seizure lasted about four minutes, the patient retaining consciousness throughout. After the spell he seemed dazed and was not able to speak for a few minutes. He then gave a lucid history of himself without any hesitancy or difficulty of speech. He suffers occasionally from headache, which is not very severe; does not complain of vertigo, nausea, or vomiting. Examination shows flattening of the right half of the face as compared with the left. The electrical reactions normal; no other disturbance of any significance can be made out. Bearing in mind the family history and on general principles, mercurial inunctions, 3 grains a day, were ordered and an iodide-bromide mixture prescribed. The patient was seen two or three times at the dispensary, and then passed out of my view for six weeks. On May 18th he returned and reported that six weeks ago he had been suddenly taken very ill, losing the power of speech and suffering intensely from headache. According to the statement of his wife, the aphasia did not develop after an epileptic seizure. The patient was semi-conscious for three days, during which time he could not speak at all. The aphasia then gradually improved, the patient brightening up at the same time. A marked degree of aphasia remains, however, and the intelligent patient tells me he frequently wishes to say something but cannot find the words for it. His speech is hesitating and slower than before the outset of aphasia. The patient is more drowsy, falls asleep in his chair at table; he has grown phlegmatic and indifferent to his family and surroundings. His headache has been intense and constant; he is not able to locate it in any special part of the head. There is no nausea, vertigo, or vomiting.

Examination (May 18th) shows marked palsy of the muscles supplied by the two lower branches of the right facial nerve, the patient himself remarking that he must remove with his fingers food which is caught between his gums and cheek on the right side. The electrical reactions are unchanged. The right hand and arm are distinctly weaker than the left (dynamometer-test: R. 25; L. 40); the legs show no difference in strength. The right knee-jerk is exaggerated as compared with the left. The pupils respond promptly to light and accommodation. The ophthalmoscopic examination made by Dr. Koller shows absence of any indication of choked disk. When the entire head is tapped lightly with a percussion-hammer *the patient points to the region of the left lower motor area as being most sensitive to the blows.* The urine is free from albumin and sugar; there is no blue-line on the gums.

Diagnosis. The diagnosis was made of a tumor of the brain involving the face and probably the arm- and speech-centres in the lower half of the left central convolutions; on account of the involvement of speech, rather forward than backward of the fissure of Rolando.

The differential diagnosis was made between specific meningitis, brain-abscess, general paresis, and a vascular lesion (thrombosis), plumbism and uræmia being out of the question. A vascular lesion could be

readily excluded by the slow development of symptoms, the signs of cortical irritation preceding any loss of power by four or five months at least, and by the presence of the tender point on the skull. General paresis occasionally begins with focal epileptic seizures, but there was in our case an absolute absence of any somatic or mental symptom of general paresis, nor does a tender point on the head occur in uncomplicated paresis. The absence of any purulent focus in the body of the patient and of any traumatic history militated against the presence of an abscess; nor were there any variations of temperature to indicate an abscess in preference to a tumor. In view of the specific history syphilis of the brain, more especially specific meningo-encephalitis of the convexity, had to be carefully considered. Three very important points could be urged against its presence:

1. In syphilis of the brain, especially of the meninges, severe headache is an *early*, often predominating, symptom; in our case the patient did not suffer from headache of any consequence till partial paralysis had developed, nor was his headache at any time more severe at night, as is often the case in specific disease.

2. The course of syphilitic brain-disease is subject to great variations in the intensity of the symptoms; sometimes from day to day, or week to week, symptoms come and go and do not show the steady development observed in the case under question.

3. Specific meningo-encephalitis yields readily to energetic specific treatment, especially when applied early—our patient grew steadily worse under a thorough course of specific treatment. Nor were there any other signs of syphilis of the nervous system, as is so often the case, present to support the diagnosis of syphilis.

The diagnosis of tumor was based upon the following facts:

1. The slow and steady development beginning with symptoms of cortical irritation (focal epilepsy), followed subsequently by a gradually increasing paralysis of the very group of muscles originally the seat of convulsive jerking, which indicates a progressively destructive morbid process.

2. The simultaneous increase of general cerebral symptoms, notably of the headache and slow cerebration, with the further development of the focal symptoms.

3 The presence of a circumscribed tender point of the skull corresponding to the part of the brain to which the focal symptoms pointed.

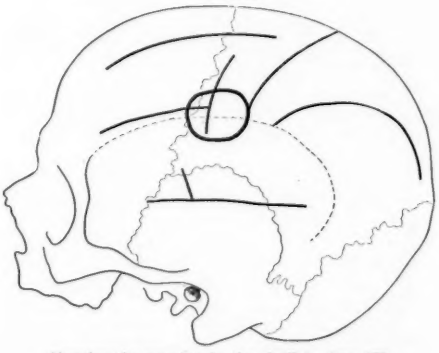
4. The exclusion of other forms of organic brain-disease.

The successive involvement of the motor centres (face, arm, and speech), the focal epileptic discharges and the presence of the tender point, indicated that the tumor was superficial, probably cortical, and not in the centrum ovale.

The patient was sent in to the Mt. Sinai Hospital, service of Dr. Howard Lilienthal, with the above diagnosis, and the request to subject him for ten days longer to specific treatment; if no change for the better occurred, to operate and remove the new growth. For reasons beyond my control, which need not be stated here, the proposed operation was put off again and again, and the unfortunate patient rubbed with enough mercury to cure him over and over again of syphilis. During this time the man's hebetude and stupor increased steadily; he would sit for hours without uttering a word; it required urging to induce him to talk at all; frequently he would not be able to call a given object by its right name,

but would nod approvingly if the name was told him. Finally he hardly said a word at all any more, which was partly ascribed to his stupor. In May he was still able to write with Hebrew characters. He understood and obeyed simple orders, but did everything slowly, with that peculiar air of absent-mindedness characteristic of the presence of a tumor. He was emotional and cried easily. The facial palsy became almost complete; the right arm was practically paralyzed; the patient dragged his right leg in walking. The knee-jerk was greatly increased and ankle-clonus developed on the right side. He complained, if he said anything at all, constantly of headache. If his head was tapped lightly with the percussion-hammer, he would now point to either side of his head, when asked where it hurt him; if his face was watched, however, *it was seen that he would screw up his face with an exquisite expression of pain, and that he would draw his head away from the hammer whenever a given point was tapped ever so lightly.* It was the same point he had formerly pointed out himself No sign of papillitis developed till the end of July, when Dr. May reported a dilatation of the veins of the retina and a slight cloudiness of the left disk.

FIG 5.

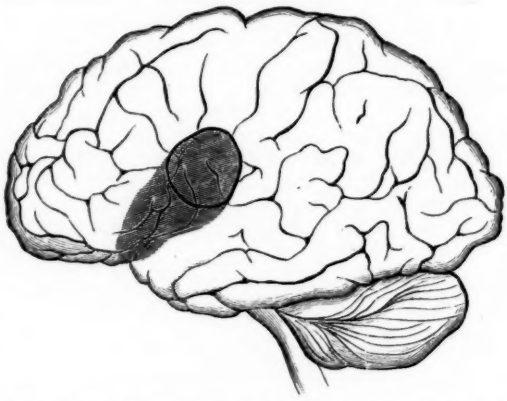


Showing the opening in the skull in Case III.

Finally, on July 25th, the patient, who had fallen away considerably, was operated upon by Dr. Lilienthal. The head was shaved the day before the operation. Immediately before the operation I determined with Wilson's cyrtometer the location of the face- and arm-centres, which I selected on account of the complete paralysis of those parts. Dr. Lilienthal marked the centre of the area determined with a small preliminary cross-incision in the scalp. I then remarked it would be well to compare the area determined with the painful point, stating that, if they did not correspond, I would prefer Dr. Lilienthal entering the skull at the seat of cranial tenderness, which I considered a diagnostic point of supreme importance. I then began tapping the patient's head, and to our surprise he showed no sign of pain. Involuntarily I had avoided the immediate vicinity of the small incision in the scalp, as it was bleeding somewhat; I now tapped at this point, and, to our gratification, the patient immediately drew his head away and screwed up his face as he had always done when examined before.

After raising a liberally sized flap which bled profusely, Dr. Lilienthal opened the skull with the hammer and chisel at the point agreed upon (Fig. 5). Everything bled, the flap, the diploe, and two branches of the middle meningeal artery, and the hemorrhage was stopped with great difficulty. The exposed dura did not bulge or pulsate, nor was it discolored. An aspirating-needle was introduced in every direction, but no resistance was felt; in perforating the dura with the needle it felt tough and thickened. The exposed area was soft to the touch, at the anterior superior edge of our opening there seemed to be somewhat more resistance. The patient had lost so much blood and his condition was so bad that we decided to open the dura at a subsequent sitting, if the patient survived the present operation. Unfortunately, in spite of transfusion being made, the patient never regained consciousness and died twenty-nine hours after the operation, the temperature rising above 106° F. immediately before death.

FIG. 6.



Showing the site of the tumor on the surface of the brain in Case III., and the part beneath the cranial opening.

The *autopsy* was made two hours after death by Dr. Yankauer: The cranial wound was sweet and aseptic; no further hemorrhage had occurred. A small ring of clotted blood was adherent to the dura along the margin of the opening in the bone. The skull-cap was raised and the brain removed *in toto*. On the left side of the brain, at the point corresponding to the opening in the skull, as indicated by the ring of clotted blood, the dura was adherent to the substance beneath and was slightly discolored. There was nowhere any sign of meningitis. The convolutions of the left hemisphere were flattened. In the left motor region a large tumor involving the lower half of the ascending frontal convolution, the operculum, the base of the second and third frontal convolutions, and the tip of the temporo-sphenoidal lobe was found; posteriorly the tumor is bounded by the furrow of Rolando, which is crossed at no point. The centres involved are the arm, face, tongue, and motor speech-centres; the last is entirely destroyed. The tumor is softer to the touch than the surrounding brain-substance, is of the color of the

latter, only mottled and of a dirtier tinge. No distinct capsule is present, but the growth is sharply separated from the brain-substance, and was partly enucleated after hardening very readily (Fig. 8). The tumor is 7 cm. long from above down and somewhat forward, 4.5 cm. broad at its broadest point, and 4 cm. deep. The dura is adherent to the upper half of the tumor, the part involving the face- and arm-centres. The adherent area corresponds to the opening made in the skull and at the same time to the upper, anterior, and posterior limits of the tumor; the latter extends downward below the lower margin of our opening 3

FIG. 7.

Photograph of part of tumor in Case III., showing the adherent dura.

cm. to 4 cm., so that we would have been obliged to enlarge the opening considerably if the removal of the entire new growth had been attempted.

The microscopic examination shows the tumor to be a spindle-cell sarcoma throughout; numerous sections made through the part to which the dura was adherent show the dura and the pia thoroughly infiltrated with sarcomatous elements, but the new growth very evidently did not originate in the coverings of the brain. The clinical course of the disease bears strong evidence, however, that the disease began in the face-centre and subsequently invaded the speech- and arm-centres.

FIG. 8.

Side view after enucleation of the tumor.

The case is instructive, I believe, in several respects. *In the first place,* it demonstrates the important fact *that optic neuritis may be absent in the presence of a large brain-tumor,* a fact demonstrated also by cases of Gowers[1] and Pel;[2] if such is the case, the absence of choked disk does not justify the postponement of an operation when the symptoms of a focal lesion are sufficiently clear and the diagnosis of a new growth otherwise well founded. *In the second place,* the case demonstrates the fact that a previous history of syphilis does not preclude the presence of a non-specific growth; in Case II. a history of syphilis was also obtained and a glio-sarcoma found at the autopsy. This raises the important question, How long should these cases be subjected to specific treatment before operation is performed? Horsley says six weeks, Starr[3] favors three months. My own experience with cases of syphilis of the brain[4] giving symptoms of focal organic disease has been that they respond with few exceptions remarkably quickly to energetic specific treatment consisting of inunctions of 3 to 5 grammes of blue ointment and iodide of potas-

[1] Gowers: Diseases of the Nervous System, vol. ii. p. 505.
[2] Pel: Berliner klinische Wochenschrift, June 29, 1894.
[3] Starr: Brain Surgery, p. 206.
[4] See article "Syphilis of the Brain." New York Medical Journal, July 13, 1895, p. 33.

sium or sodium in doses of 300 to 400 drops of the saturated solution a day. The rapid improvement in the condition of these patients is often astounding; in one case which I have in mind the symptoms resembled those in the case in question in many respects, intense headache, aphasia, paresis of the facial muscles and right arm, and choked disks being present; the patient was found in profound coma the second day I saw him with a pulse as low as 40 (heart-beat counted and 10 respirations to the minute); inunctions were commenced the same day and the iodides added as soon as the patient was able to swallow them; within a week the headache was gone and the aphasia and hemiparesis were greatly improved; within three weeks the patient was able to return South with but few traces of the disease left. Other cases of the kind might be mentioned, but no doubt many of the gentlemen present have had similar experiences. I should like to urge, therefore, that if no improvement in the symptoms, especially in the headache, is obtained within three weeks, none is likely to occur, providing the specific treatment is energetic and the patient is not cachectic at the time the treatment is commenced. Prolonged mercurial treatment in non-specific cases is apt to influence the general condition unfavorably and to weaken the patient's powers of resistance to the shock of subsequent surgical interference. In our case the patient should have been operated upon in May, as soon as the diagnosis of a new growth had been made with certainty and thorough specific treatment had failed to stay the course of the disease.

The absence of headache for the first five or six months, and of nausea, vomiting, and vertigo throughout is another point of interest in the case. This simply supports the view expressed in connection with Case I., that symptoms present are of greater value in arriving at a diagnosis than the absence of other symptoms, which might be looked for.

The inefficiency of probing for a tumor with an aspirating-needle could not be demonstrated more conclusively than shown by this case—although the tumor was immediately beneath our opening, the needle gave absolutely no information as to its presence. The greater resistance to the touch felt at the anterior superior margin of our opening was offered by the normal brain-substance, which was harder than the tumor.

In conclusion, the three cases reported show, I believe, the truth of the statement that brain-surgery in order to be successful requires an early diagnosis and early operation. The best result was obtained in Case I., because it was operated upon as soon as the diagnosis of an organic lesion was assured and specific treatment had failed.

Remarks by Dr. Lilienthal.

It is my belief that if we are ever to have success in this field of surgery, operation must be undertaken early. Where a cortical lesion can be accurately localized, to wait for general symptoms such as may be

expected to arise from pressure, or to wait for the systemic poisoning known as cachexia, is to lose the possibility of anything more than palliation. As in gastric cancer it is usually too late for a curative operation when a tumor is palpable, so in circumscribed cortical lesions of a non-syphilitic nature choked disk and vomiting indicate the existence of something which might better have been attacked before the supervention of these symptoms. I do not deny the value and even the necessity of tentative antisyphilitic medication, but I believe that where no direct history points to syphilis as a cause of the trouble, weeks, not months, might better measure the time of trial.

The death of this particular patient can, I believe, be ascribed almost entirely to the furious bleeding from enormous newly formed vessels in the diploë. The actual amount of blood lost was not greater than I have frequently seen in operations on persons of the general physique of this man, but his condition was poor and his powers of resistance lower by far than I had estimated. The hemorrhage was controlled as well as possible by gauze-compression over the cut surface of the bone, but at every fresh bite of the rongeur the flow from the same vessels again divided was so severe that before the time came to open the dura the pulse had flagged to such an extent that the operation had to be suspended. It was my intention to open the dura in a day or two, thus making the operation in two stages, but the death of the patient from acute anæmia, in spite of repeated intravenous saline infusion, put an end to everything. It would in such cases be better to operate in two or three or even more stages. By great care the slightly increased danger of sepsis could, I believe, be overcome, and even with sepsis there is a better chance of ultimate success than with dangerous hemorrhage. Since my sad experience with this patient, I have in other cranial cases employed a wax recommended by Dr. R. H. Cunningham, of this city, and I am so pleased with the prompt and easy manner in which it can be used to check bleeding, that I shall be unwilling to undertake another operation on the skull without having a supply at hand. This wax is made by boiling in a test-tube sheets of soft white wax, such as is used in the manufacture of artificial flowers. It turns slightly brown in the boiling. A little castor oil—about one drop to the gramme—is added to this liquid wax and the whole is allowed to cool. The upper part of the test-tube is then heated to sterilize it thoroughly, and is cotton-plugged. These tubes of wax will keep indefinitely. When it is desired to make use of it, a glass rod is to be heated and melted into the solid wax after removing the cotton plug. When the rod is firmly *set* in the wax, its end projecting some inches from the open end of the test-tube, hold the test-tube in the flame, using the rod as a handle. Thoroughly heat the tube, beginning at its mouth and slowly revolving it on its long axis. When the wax is reached quickly heat this part of the tube and pull

the thimble of wax out by means of the rod. This wax may now be put into sterile hot salt-water, and should be kneaded until it is of the right consistency. At each bite of the forceps a little wax is to be pressed with the finger into the bleeding bone. The wax is aseptic and may be left in place.

SYPHILIS AND THE ETIOLOGY OF ATHEROMA.

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In this paper I purpose shortly to consider the nature of arterial atheroma, more especially with regard to the part, if any, played by syphilis in its causation. Everyone is familiar with the appearance of atheroma in the aorta, the formation of thickened patches, the fibrous, pulpy, or calcareous formations in its inner coat. It is not my intention to describe these changes, which have already so often been described both macroscopically and microscopically, but to discuss certain questions in their etiology.

The importance of the part played by syphilis in the causation of aneurisms[1] must certainly be acknowledged, and hence some would argue that syphilis exerts a like influence in the production of arterial atheroma, but the latter conclusion is not a fair one. In order to show that such a conclusion is not justified it becomes necessary to make a digression and to discuss shortly the *rôle* of syphilis in the causation of aneurisms.

For this purpose it will be best to confine ourselves to aneurisms of the aorta, so as to exclude, as far as possible, aneurisms due to traumatism, bruising, and embolism, and especially to exclude those caused by septic inflammation of the arterial walls, set up by emboli in cases of infective endocarditis.[2] Aortic aneurism occurs chiefly at the middle period of life; out of ninety-two cases analyzed by Dr. Thomas Hayden, sixty occurred between the ages of thirty and fifty,[3] whereas the same author found that atheroma was most common after the age of sixty. In spite of this, however, Dr. Hayden evidently considered aneurism to be due to atheroma, or at least to antecedent changes in the vessel-walls,

[1] The statistics on this subject are, of course, as liable to error and as hard to ascertain correctly as those of antecedent syphilis in cases of tabes dorsalis. Professor Clifford Allbutt tells me he would say that in 90, or even 95, per cent. of aneurisms there has been previous syphilis. See also F. H. Welch, "On Aortic Aneurism in the Army." Med.-Chir. Trans., 1876, vol. lix.

[2] See J. Langton and W. Bowlby, "Multiple Embolism of the Arteries of the Extremities." Med.-Chir. Trans., 1887, vol lxx.

[3] See "Diseases of the Aorta," in Quain's Dictionary of Medicine, first and second editions. Other statistics agree in pointing to the period between the ages of forty and fifty as the commonest for aortic aneurism.

of which atheroma may be looked on as the type; this is what he said: "Thus, whilst deterioration of the arterial coats as typified in atheroma is most common after the age of sixty, one of its ordinary consequences, aneurism, belongs to an earlier period of life. The apparent discrepancy may be explained by the more frequent employment of men under fifty in severe labor, and their greater capacity for extreme muscular effort earlier in life, the condition of the arterial wall which favors aneurism having been already established."

That violent efforts and high blood-pressure are most important factors in the causation of aortic aneurisms there can be no doubt,[1] but I believe that the explanation given by Dr. Hayden is not sufficient to account for the discrepancy acknowledged by him between the favorite age for aortic aneurism and the period of greatest frequency of aortic atheroma. It appears to me more natural to conclude that ordinary atheroma is not, after all, the commonest cause of sacculated aneurism of the aorta, but that a localized inflammatory infiltration of the aortic wall[2] usually precedes the aneurismal dilatation.

There seems to be nothing against the view that such patches of subacute aortitis represent sometimes a true tertiary syphilitic process of the nature of a gummatous infiltration, and this view best explains the importance of syphilis as an etiological factor in aortic aneurisms.

In 1868 Prof. Clifford Allbutt,[3] when describing the histological character of the diseased cerebral vessels in a syphilitic man, aged thirty-one years, drew attention to a condition of chronic arteritis with great nuclear and cellular proliferation, which affected all the coats to some extent,

[1] Hence the much greater frequency, so often alluded to, of aortic aneurisms in men than in women, and in men who make great muscular efforts than in men who do not. This is confirmed by the fact that the aortic arch, where naturally the strain is greatest, is the most common site for aneurisms. Strain probably acts likewise as a predisposing cause of atheroma. The arteries of the lower extremities, which are more liable to strain than those of the upper extremities, are likewise more liable than the latter to atheroma; the pulmonary artery, where the blood-pressure is much lower than in the aorta, is seldom affected by atheroma, except when the blood-pressure in the pulmonary artery is pathologically increased by pulmonary emphysema, disease of the mitral valve, etc. (See S. Wilks and W. Moxon, "Lectures on Pathological Anatomy," 3d ed., 1889, pp. 155–57.) Precisely how strain can induce atheroma remains doubtful. A discussion as to whether a chronic inflammatory process plays an intermediate part in these cases would be unprofitable, but we may bear in mind that, though moderate functional activity and mechanical movements must be regarded as natural stimulants tending to the proper nutrition of the tissues, excessive functional activity and mechanical strain may probably cause malnutrition and irritation, giving rise to chronic degenerative and inflammatory changes. It is not then a matter for surprise that strain sometimes helps in the production of atheroma; the part, however, which it plays in the production of atheroma is probably quite different to the part which it plays in inducing aneurism. In the latter case the usual action of strain is most likely the mechanical thrusting out of a part of the vessel-wall already softened by some true inflammatory process.

[2] The very first stages of a sacculated aneurism of the aorta are, however, not likely often to fall under the notice of the pathological anatomist.

[3] "Cerebral Disease in a Syphilitic Patient," St. George's Hospital Reports, 1868, vol. iii. p. 61. What appear to have been miliary gummata had already, in 1863, been noticed by Dr. S. Wilks in the bloodvessels of the brain in the case of a syphilitic woman, aged 38. See Guy's Hospital Reports, 1863, 3d series, vol. ix. p. 45.

but especially the middle and inner coats. He said, "The distinction between the coats was in many places lost; in other places the inner was detached from the middle coat by a nest of nuclei and granules. . . . in other places, again, pear-shaped processes, thrust inward from the middle and inner coats, projected into the lumen of the vessel, carrying the inner coat before them. . . . Their contents were chiefly of an opaque granular character. I found, however, no dark layers of fatty degeneration like those we see in common atheroma; and on the whole the degeneration was not of so low a kind as in atheroma, the products being generally of higher physiological value." Although this account and the subsequent paper by Heubner,[1] of Leipzig, described syphilitic disease of the small arteries, it may be inferred that there is also likely to be a difference between a chronic or subacute syphilitic inflammation in the aorta and ordinary atheroma.[2]

I now return to the original question: the nature of aortic atheroma and its relation to syphilis. The digression was undertaken to point out that syphilis may play a much greater part in the production of aortic aneurism than it does in the production of atheroma, not to urge that syphilis was of no account in the causation of atheroma.

Any local inflammation seems to predispose to chronic atheromatous changes. It is an old observation that atheromatous changes are very likely to be found in valves which have been slightly affected by previous rheumatic endocarditis. Chronic atheromatous thickening is not rarely seen in congenitally malformed cardiac valves, such as when there are only two instead of three aortic or pulmonary valves. In these cases one of the valves is often divided into two parts by what John Hunter, in describing the condition, termed a "crossbar."[3] Probably such valves are sometimes the result of intrauterine endocarditis,[4] the "crossbar of Hunter" representing the part where two valves during fœtal life have undergone inflammatory adhesion so as subsequently to form a single valve in the adult; it seems, therefore, fair to consider that when such valves undergo chronic thickening the intrauterine inflammation, like ordinary rheumatic endocarditis, or any other inflammation, has acted as a predisposing cause to the subsequent degenerative changes of atheromatous nature supervening in adult life.

A patch of syphilitic aortitis, besides its chances of giving rise to an aneurism, would, like any other inflammation, predispose to a subsequent atheromatous process, and this is, I believe, the chief part played by syphilis in the causation of atheroma.

[1] Professor O. Heubner: Die leutische Erkrankung der Hirnarterien, Leipzig, 1874.

[2] See S. Wilks and W. Moxon: Lectures on Pathological Anatomy, 3d ed., 1889, p. 152.

[3] Sir James Paget, in 1844, drew attention to the frequency of disease affecting the aortic and pulmonary valves, when there were congenitally only two instead of three of them. Med.-Chir. Trans., vol. xxvii. p. 188. See also Dr. J. B. Peacock: Monthly Journ. Med. Science, May, 1853, vol. xvi. p. 387.

[4] See Dr. J. B. Peacock: Monthly Journ. Med. Science, May, 1853, vol. xvi. p. 385.

Some would make of atheroma itself a chronic inflammatory process, but of this I think there is not sufficient evidence. As in the case of arterio-sclerosis, and as in some cases of granular contracted kidney,[1] and of chronic fibroid changes in the cardiac muscle,[2] the question arises in this case, also, what definition of inflammation we are to accept as our criterion in judging whether inflammation is present or not. The "rubor, tumor, calor et dolor" of Celsus, though still of great service as ordinary clinical tests for inflammation when occurring in extensive areas accessible to touch or view, is hardly satisfactory as a scientific definition. For the present purpose I would prefer such a modification of modern definitions as that suggested in my recent paper on "Arterio-sclerosis,"[3] namely, that inflammation is "the series of tissue-changes caused by an injury or by the presence of some harmful irritant, and usually leading to an accumulation of cells in the part affected."

This includes the cell-accumulation resulting from proliferation of the fixed cells as well as that resulting from the migration of leucocytes. It includes tuberculous affections and the other infective granulomata; it will also include cancer and sarcoma, if ultimately the presence of coccidia-like organisms should be proved to be necessary to their development. The occurrence of necrobiosis, secondary to inflammation or due to the same original cause, will not confound the definition.

If we accept such a definition, does atheroma fall under the head of inflammation? The cell-accumulation is certainly present, but an injury or irritant cause is probably not essential to the production of atheroma, unless, indeed, deficient nutrition be regarded as an irritant cause. Mere malnutrition and deficient nutrition are causes of necrobiotic and degenerative changes, acute and chronic; but, if they should be regarded as irritants, it would become hard, indeed, to separate chronic inflammatory from degenerative processes.

It is doubtful whether in many conditions it is possible to draw a hard-and-fast line between chronic inflammation of tissue and chronic degeneration of tissue. One can understand that the blood by deficiency in quantity, or, at least, by deficiency in its chief nutrient components, may give rise to a process of simple malnutrition. Besides being merely deficient in quantity or nutrient quality the blood supplied to the tissues may contain injurious substances either owing to excessive formation in some tissue of the body of a natural toxic product of tissue-metabolism, or to its deficient excretion from the body,[4] or to the formation by diseased tissue-metabolism of toxic sub-

[1] Especially those cases chiefly seen in old people, in which the capsule of the kidney strips off quite readily, though the surface of the cortex appears somewhat pitted or granular, and the cortex of the whole kidney is slightly diminished in size.

[2] See H. Huchard: Maladies du Cœur et des Vaisseaux, 2d ed., Paris, 1893, pp. 170 *et seq.*

[3] The American Journal of the Medical Sciences, September, 1894, p. 287.

[4] Or to deficient washing out of products of catabolism from some particular organ. Thus, the increase of fibrous tissue taking place in the liver and spleen from passive congestion

stances (true auto-intoxication) not formed at all in the healthy body, or, lastly, owing to the formation within the body of toxic products resulting from the metabolism of parasitic microbes. Such toxic substances circulating in the blood may, of course, act as irritants and cause inflammatory changes in the tissues, the effects of inflammation then becoming added to those of simple degeneration. It is not surprising, therefore, that just as the causes of simple degeneration may be associated with those of inflammation, so the pathological alterations in tissues due to mere degeneration are frequently associated with those due to inflammation.

The difficulty of distinguishing between a simple degenerative process and the results of chronic inflammation is especially great in the case of atheroma, which is certainly often accompanied and preceded by undoubted inflammatory changes. Dr. W. Moxon[1] thought that atheroma was in continuity with arteritis, graduating from a condition in which no inflammatory results can be found into one in which inflammation is distinctly present. According to Dr. Thomas Hayden,[2] however, "Atheromatous transformation of the coats of arteries is a result of malnutrition, and essentially degenerative," though "not infrequently the products of a low form of inflammation of the internal and middle coats are combined with those of tissue-degeneration." Dr. Douglass Powell[3] considers atheroma of the aorta to be a degeneration, the result most commonly of preceding inflammatory change, but sometimes occurring primarily as fatty transformation from senile decay.

The difficulty is increased, since it is possible that in cases of tissue-degeneration the products of degeneration may themselves, if unremoved, even without the presence of microbes, act to some extent as irritants to the surrounding tissues. In this way a condition of secondary chronic inflammation would be induced, although the primary condition was one of simple degeneration. On the whole, although atheroma may be frequently preceded or even accompanied by inflammation[4] the weight of evidence seems to be that it may likewise occur as a primarily degenerative process.

It is probably best to look on such primary atheroma as a process occurring in the larger arteries corresponding (etiologically, though not anatomically) with arterio-sclerosis[5] in the arterioles. According to this

may be due not merely to the passive hyperæmia, *per se*, nor to increased venosity of the blood, but rather to the accumulation of the products of tissue-catabolism occurring in the congested organs owing to the local stagnation of the blood.

[1] Guy's Hospital Reports, 1871, vol. xvi.

[2] Diseases of the Heart and of the Aorta, 1875, p. 1073.

[3] Reynolds' System of Medicine, 1879, vol. v. p. 19.

[4] Virchow and Niemeyer, however, considered inflammation a necessary antecedent to the changes found in atheroma. See R. Virchow's Die Cellular Pathologie, 1858, p. 319; and Felix von Niemeyer's Lehrbuch, 9th ed., Berlin, 1874, pp. 443 *et seq.*

[5] In the present paper the word "arterio-sclerosis" is used as synonymous with the arterio-

views the same condition of malnutrition (whatever the primary cause of this malnutrition may be) which induces arterio-sclerosis in the walls of the smaller vessels may act on the coats of the aorta and larger vessels so as to induce atheromatous changes.

With regard, however, to the anatomical difference between the process of arterio-sclerosis in the small vessels and that of atheroma in the large ones, it must be remembered that, since the walls of the larger arteries are thicker than those of the smaller ones, the former are especially dependent for their nutrition upon the condition of their vasa vasorum.[1] The peculiar feature of atheroma is the cell-accumulation which takes place in the deeper part of the tunica intima (*i. e.*, that part of the intima nearer to the tunica media) of the affected artery. This is the portion of the arterial wall which is naturally worst nourished, for its blood-supply must be obtained from the vasa vasorum, whereas that of the immediate inner surface of the artery is derived from the blood which constantly bathes it. Consequently, when the vasa vasorum of a large artery are in any way stenosed the deeper (external) layer of the tunica intima is the first part to suffer in its nutrition. It has, indeed, been pointed out[2] that the position of the cell-accumulation in atheroma may be partly due to stenosis of the vasa vasorum by Bright's disease or syphilis.

Stenosis of the vasa vasorum, from whatever cause, is, then, likely to induce atheromatous change in the part of the arterial wall in which the vasa vasorum are affected. H. Huchard,[3] of Paris, has gone so far as to make of atheroma a "localization of arterio-sclerosis;" that is to say, he makes it due to a process of arterio-sclerosis affecting not to the same extent the arterioles over the whole body, but localized to the vasa vasorum of certain arteries, the stenosis of the vasa vasorum causing atheromatous changes in the walls of the affected arteries.

It is evident that alterations in the quality of the blood induced by gout, syphilis, and alcohol, and all the asserted causes of arterio-sclerosis may likewise be alleged as causes of atheroma. On these questions[4] I shall not enter in the present paper, but shall content myself with having

capillary fibrosis described by Gull and Sutton in 1872 (Med.-Chir. Trans. vol. lv.). This restricted use of the term is both usual and convenient.

[1] This difference in the conditions of nutrition between the main arteries and the small arteries has been aptly compared to the laws which the Romans made for the maintenance of their celebrated roads. The large arteries have their vasa vasorum, just as the Roman *primæ viæ* had their independent maintenance; whereas, just as the *viæ vicinales* had to be kept in repair by the neighboring populations, so the nutrition of the walls of the smallest arteries largely depends on the state of the organ which they themselves supply. See S. Wilks and W. Moxon, op. cit. 3d ed., p. 159.

[2] See Dr. F. W. Mott's paper on "Cardio-vascular Nutrition," Practitioner, 1888, vol. xli. pp. 161–173.

[3] Maladies du Cœur et des Vaisseaux, 2d ed., Paris, 1893, pp. 96 *et seq.*

[4] To some extent I have entered on these questions in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, September, 1894.

summed up, I hope intelligibly, the evidence in favor of the views (certainly not new ones):

1. That atheroma of the aorta, though often preceded or accompanied by inflammation, is itself a merely degenerative process: that syphilitic or other inflammation may locally predispose to atheroma.

2. That aneurism of the aorta is induced more often by the yielding of a portion of its wall affected by syphilitic or other inflammation than of a portion affected by simple atheroma.

SUPRAVAGINAL HYSTERECTOMY FOR IMPOSSIBLE LABOR, WITH INTRAPELVIC TREATMENT OF THE STUMP.[1]

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I. The Technique of the Operation.

In opening the discussion upon the technique in hysterectomy for impossible labor, it would not be profitable to enter extensively into the early history of this subject, for the profession is already quite familiar with it. Nor have I anything new to present, as the technique which I shall describe and recommend will be practically the same as that which was advocated in the operation for fibroid tumor, in a paper read before the American Gynæcological Society in 1892,[2] and which has been generally accepted as the best method of treating the stump in all cases in whch supravaginal hysterectomy is indicated in the non-pregnant uterus.

The advantage of dropping the cervix within the pelvis and leaving it in its natural position and relations had long been recognized; but when the cervical tissues were ligated *en masse* or in sections, as was practised by Schröder and his followers, the mortality from hemorrhage and sepsis was so great that the extraperitoneal method of constricting the stump with a serre-nœud, and fixing it in the lower angle of the abdominal incision, became and remained the method of expediency until it was shown that hemorrhage could be controlled and sepsis obviated by a procedure which left the cervix entirely free and intrapelvic. The mortality of this intrapelvic method is at *least* as low as that of the extraperitoneal fixation method, and the advantages are so infinitely greater that no one who has had experience with it could be induced to return to the older way.

That this method could be safely applied in the Porro-Müller opera-

[1] Read before the College of Physicians of Philadelphia, February 5, 1896.

[2] "Supravaginal Hysterectomy without Ligature of the Cervix; a New Method." By B. F. Baer, M.D. Transactions of the American Gynæcological Society, 1892-93.

tion I was at once convinced, for the first case upon which I operated was one of pregnancy at the fifth month in which labor was rendered impossible by the presence of a fibroid tumor which impacted and obstructed the pelvis, and in which the symptoms became so urgent that radical measures for immediate relief became imperative. This was not a full test, I grant, for the tissues of the cervix had not yet attained the size and vascularity which obtain at the full term of gestation; but later experience has fully established this question, for uniform success, I believe, has followed in all the operations at full term in which the cervix was treated in this way, and the recovery of the patients was as uneventful as so usually occurs in the removal of the uterus in the non-pregnant state by this method.

The question as to choice of the operation will be discussed by my colleague, Dr. E. P. Davis. I shall therefore proceed at once with a detion of the technique, and follow with a brief record of two cases. scrip-

In order that the best success may be won, it is necessary that the diagnosis of impossible labor and a decision as to the choice of the operation shall be made previous to the full term of gestation, or at least before labor has begun, so that the environment and preparation of the patient may be rendered as perfect as possible. It is also necessary that efforts at delivery per *vias naturales* should have been avoided. The same arrangements should be made, if possible, as to the operating-room, Trendelenburg apparatus, and other operative equipment as for ordinary hysterectomy in fibroid tumor, and two more assistants are required than for the former operation; one to control hemorrhage by grasping the broad ligaments and cervix, the other to take the child from the hands of the operator as soon as it is delivered. If the patient does not object, she should be placed on the table before the anæsthetic is begun. The assistants and nurses should be previously informed regarding their various positions and duties during the operation, so that nothing may occur whereby the life of the child might be endangered. When the patient is anæsthetized, the operator takes his position on the right side of the patient, his instrument-tray being close to his right hand. Two assistants stand opposite; a third stands at the right of the operator, ready to receive the child. An incision, long enough to deliver the uterus, is now quickly made and observation is taken as to the presence or absence of adhesions. If any adhesions exist, they must be separated before the uterus is delivered. The organ is then tilted slightly, so that a cornua emerges, when the remainder passes through easily. As soon as the uterus has emerged an assistant immediately brings the edges of the abdominal incision together under it. A large sterilized gauze-pad, which has been prepared for the purpose, is then placed under the uterus. This protects the abdominal cavity and serves as an absorbent of the discharges from the fœtal envelope. The other opposite

assistant quickly encircles the broad ligaments and cervix with the left hand and makes sufficient constricting pressure to control hemorrhage. Incision is next quickly and carefully made through the uterine wall in the median line, beginning near the fundus and extending downward. The right hand now ruptures the membranes and seeks preferably the feet of the child, by which it is delivered. If the placenta happens to be in the way, it is pushed aside or broken through, and no other attention given to it at this moment. The child is passed to the assistant in waiting to receive it, when the cord is clasped by a hæmostatic forceps and severed; such measures as may be required for the resuscitation of the child being at once applied by the assistant in charge of it. The placenta is next delivered and the uterine cavity thoroughly emptied and cleansed. The uterus will now probably be found firmly contracted, and the operation may be continued without attention to the uterine incision, the assistant still grasping the pedicle.

When ready to proceed with the hysterectomy the pelvis should be elevated, but not to the extreme degree that is called for in the Trendelenburg posture. The latter is seldom necessary and may be harmful. Careful examination should now be made so that a clear idea may be obtained as to the location and relation of the broad ligaments before the ligation is begun. This is especially necessary if the labor had been rendered impossible because of fibroid tumor. The first step in the hysterectomy is the passing of a single silk ligature through the broad ligament near the cervix, which, being tied, controls the ovarian artery and veins. The ligament is then severed just below the tube and ovary, the incision being carried close to the cervix. The knife is then run lightly across the lower segment of the uterus, an inch or two above the peritoneal reflection of the bladder, care being taken to incise the peritoneum only. The latter is then stripped down with the handle of the scalpel. The purpose of this is twofold: first, it insures protection to the bladder and forms the peritoneal fold which is to cover the raw end of the cervix after the uterus has been amputated; and, second, it facilitates the next and most important step, viz., the ligation of the uterine artery. If the artery is prominent and easily reached, it may be ligated separately within the folds of the broad ligament; but if it is deeply situated and cannot be easily isolated, which is often the case, the finger and thumb then grasp the broad ligament on its anterior and posterior surfaces and locate the vessel by its pulsation. A ligature is then passed through the entire broad ligament below the artery, and just outside of but close to the cervix, care being taken to avoid the cervical tissue on the one hand and the ureter on the other. The ligature is now tied. Similar steps are taken to secure the vessels on the opposite side and the cervix is then amputated just above the vaginal attachment. A small posterior fold is formed by stripping up the peritoneum while the

amputation is being made. The stump is now held in the grasp of a small tenaculum forceps until the technique is finished. As a rule, if the main arterial branches have been properly ligated, the raw end of the cervix will be found dry; but if any hemorrhage is present, of course additional measures must be taken to control it. If a vessel is found spurting, it is ligated. If oozing from the stump is general and *persistent*, which is more likely to be the case in the puerperal cervix—it is very rarely so in the non-pregnant—catgut sutures should be passed through the cervical tissue to control it. These sutures must be placed so as *not to include* the peritoneal folds, and are to be covered by these folds in the final technique. They should also be placed on either side of the cervical canal so that it may not be occluded. When all bleeding has ceased the peritoneal folds are closely adjusted over the stump, and as many Lembert sutures are placed as are necessary to maintain this *close* adjustment. The number required will depend upon the manner in which the uterine arteries were ligated. If the ligatures securing these arteries have also passed through the broad ligament, the peritoneal folds will be found taut, so that when drawn over the stump they will fit closely and press firmly against each other. Under these circumstances the adjustment may be so firm that further suturing is unnecessary, the edges being merely infolded; but if this firm and close adjustment does not exist, then, of course, it must be secured by as many Lembert sutures as are, in the judgment of the operator, necessary. Nothing whatever is done to the cervical canal if the tissues are in a healthy state; but if efforts at delivery have been made, or if the child was dead and septic discharges have been occurring, the canal and vagina must be thoroughly disinfected. The stump is now released, when it immediately recedes into the pelvis and occupies its normal position. After toilette of the peritoneum the abdominal incision is closed and dressed in the usual way. Drainage is almost never necessary.

In the original description of the technique the following sentence occurs: "The steps of the operation vary somewhat, to suit the complications which may be present in the individual case, but the general direction and the conclusion are practically the same in all cases."[1] If it had been thought necessary to elaborate this statement, it would have been written somewhat as follows: The termination of the technique by which the cervix is left without a ligature in its tissues, the cervical canal undisturbed, and the stump securely covered under the peritoneal folds, is not always accomplished and completed by the same routine. For instance, it might be most convenient to begin by first ligating on the right side. If not so, begin on the left. In another case it might be

[1] Ibid.

deemed best to grasp the ligaments, including the bloodvessels, with a clamp-forceps, sever the ligaments, amputate the cervix, and then place the ligatures, with the uterus out of the way. At another time it might be deemed best to ligate one broad ligament, sever it and amputate the cervix, and then grasp and sever the vessels and ligaments on the other side, thus completing the technique, again with the uterus out of the way. Each case should be managed by the steps which will best facilitate the conclusion of the operation as described.

CASE I. *Supravaginal hysterectomy for fibroid tumor complicating pregnancy and rendering labor impossible.*—Mrs. H., aged thirty-seven years, was married in February, 1891. Menstruation had become rather profuse during the two preceding years, but the patient considered herself in good health until five months after her marriage, when she began to experience pelvic pressure-symptoms. Her catamenia had been suppressed in June. About September 1st she was suddenly attacked with severe pain in the pelvis and along the course of the sciatic nerves. She also suffered severely from rectal and vesical tenesmus. I first saw the patient on September 28th. She was then extremely anæmic and appeared to be in great distress. The abdomen was distended by an irregular tumor which extended above the umbilicus. The tumor was in two parts, being larger on the right side and separated by a sort of hour-glass constriction. The mass on the right side was rather globular and conveyed a boggy, semi-fluctuating sensation, while that on the left was quite firm, at one point having a projection of almost bony hardness. Vaginal examination revealed the pelvis to be occupied by a firm, hard mass larger than a child's head. It entirely filled the pelvic cavity and was immovably fixed. The cervix uteri could not at first be found, but it was finally located above the transverse ramus of the pubic bone and almost out of reach of the finger, where it was flattened between the bone and the tumor. By combined palpation the globular mass on the right side was shown to be continuous with the cervix. The usual mammary changes of pregnancy at the fifth month were present, and there was a well-marked uterine bruit. The diagnosis of fibroid tumor complicating pregnancy and rendering labor impossible was established.

The great suffering and danger of the patient made it imperative that steps should be at once taken for her relief, and she was transferred to the Polyclinic Hospital on the next day, September 29th.

Operation October 2, 1891: After anæsthesia I endeavored to dislodge the tumor and elevate it into the abdominal cavity, with the hope that the pregnancy might go to term, but failed, and therefore decided to open the abdomen. I began by making an incision three inches in length, when the pregnant uterus was exposed to view. The organ was above and resting on the right side of the tumor, being connected with the latter by a pedicle about an inch in diameter. The left broad ligament and the tube and ovary were stretched over the tumor. Passing my hand beneath the uterus and over the pelvic mass, I found the latter very firmly fixed in the pelvis, not, however, by inflammatory adhesions. The incision was now slightly increased, when the uterus emerged from the abdominal cavity. The tumor was then dislodged after great effort and rotatory movement. The propriety of removing the tumor and

leaving the pregnant uterus was now considered, but further examination showed that the organ contained another tumor imbedded in its wall; there were also several malignant-looking white protuberances on its surface. I therefore determined upon hysterectomy. The operation was concluded by the technique described, although the different steps were not carried out in the same order, for it was during this operation that the method was evolved. In this case the peritoneal folds were secured by a row of Lembert sutures. The patient made an uninterrupted recovery, being apparently convalescent from the beginning. I examined this patient four years after the operation and found her in perfect health.

CASE II. *Supravaginal hysterectomy for impossible labor in a woman who had been delivered by the Cæsarean section eighteen months previously.* —Mrs. E. H., aged twenty-seven years, entered the Polyclinic Hospital by direction of my colleague, Dr. E. P. Davis, on January 14, 1894, in labor. The patient had been examined some time previously by Dr. Davis, when it was determined that the successful delivery of her child would be impossible without operative aid.

"Examination of her pelvis at this time gave the following measurements:

	Cubic centimetres.
Anterior superior spines	28
Crests	30
Trochanters	29 5
External conjugate	19.5

"Vaginal examination showed the rami of the pubis approximating each other more closely than normal. Palpation of the inner surface revealed a funnel-shaped pelvis, the cavity narrowing very appreciably toward the outlet. In comparison with the breadth of the patient's shoulders and the width of the iliac bones, it was seen that she had a flattened and converging pelvis."

"This was her sixth pregnancy. Her first, third, fourth, and fifth labors had been terminated by the use of the forceps, each labor resulting in the birth of a dead child. All of these stillborn children were large, weighing over twelve pounds. The second pregnancy resulted in the spontaneous delivery of a living male child, after a very severe labor, but this child happened to be quite small."

Some hours after her admission Dr. Davis kindly requested me to see the patient in consultation with him and Dr. R. P. Harris. The question of symphysiotomy *versus* Cæsarean section had been discussed before my arrival, and for reasons stated by Dr. Davis, in his report of the case, the latter operation was favored. Dr. Harris at first favored symphysiotomy, but the apparently large size of the child and the diagnosis of breech presentation, together with the peculiarly deformed pelvis, caused him to change his view. I very readily concurred in the wisdom of this choice and had the pleasure of aiding in the operation, which was immediately undertaken. The child, a female, weighed about twelve pounds. The patient and child both did well.

A year later Mrs. H. feared that she was again pregnant, and examination revealed that she was about three months advanced. She was urged to keep herself under observation so that premature labor might be induced at the proper time, should it be deemed advisable. The relative risks of this operation, in view of the recent Cæsarean section, were explained to her.

She did not favor the premature labor, largely because of the greater danger to the child, and for the additional reason that she wished to be protected from the risk of future pregnancy should it be again necessary to make abdominal section. She did not again report until near the full term, when she was transferred to my care. She entered the Polyclinic Hospital on July 9, 1895, a week before full term. The abdomen was greatly distended and the child was evidently large. The breech appeared to be in the right iliac fossa, and the heart-sounds were best heard about three inches above and to the right of the umbilicus. The uterine bruit was heard most distinctly over the anterior surface. The examination of the pelvis agreed with that already given. It appeared to be a shallow funnel, the greatest contraction being at the outlet.

Both the patient and her husband were urgent in their request that meaures should be taken to save the patient from the danger of future pregnancy.

She was accordingly placed in preparation, and on July 16th, late in the afternoon, signs of approaching labor were manifest. I was telegraphed for, having gone out of town for the evening, and at eight o'clock the operation was begun. I was ably assisted by Drs. Erck, Wells, and Gans. Incision through the old cicatrix exposed the uterus; the organ was then slightly tilted so that the right cornua could emerge, when the remainder was easily delivered. Dr. Wells now controlled the circulation by encircling the broad ligaments and cervix with the left hand. The uterus was then incised, the membranes ruptured, and the child delivered by the breech, which was found in the right iliac fossa. The cord twice encircled the child's neck, but it was not in the least asphyxiated and began to cry almost before it was out of the uterus. The placenta was attached to the anterior wall, in the identical position which it occupied in the previous pregnancy, when the Cæsarean section was performed. By the time the child, placenta, and membranes were delivered the uterus was firmly contracted, and remained so during the hysterectomy, which was concluded by the technique just described. The patient withstood the operation without the slightest evidence of shock and her recovery was as easy as after a normal labor. The child weighed about twelve pounds. She has nursed the child continuously since the operation. It is now seven months of age, and continues robust.

SUPRAVAGINAL HYSTERECTOMY FOR IMPOSSIBLE LABOR, WITH INTRAPELVIC TREATMENT OF THE STUMP.

By Edward P. Davis, A.M., M.D.,

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II. Choice of the Operation.

Obstetric surgery is the natural outgrowth of the application of improvement in surgical methods and knowledge of antisepsis to obstetric practice. The result is seen in the saving of infant life and in the preservation, not only of the mother's life, but also of her health and vigor.

Difficult extraction of the fœtus by the use of forceps, with mutilation of the mother and subsequent death of the child, may be avoided by the application to obstetrics of modern surgery. The term Cæsarean section has become indefinite because improved methods of operation in some instances supersede the simple and ancient procedure commonly known as Cæsarean section. At the present day, in cases where natural birth is impossible by reason of disproportion in size between mother and child, the obstetrician has the choice of symphyseotomy, cœlio-hysterotomy, or cœlio-hysterectomy. In the last of these he must discriminate between cœlio-hysterectomy with the extrapelvic treatment of the stump, and cœlio-hysterectomy with the intrapelvic management of the stump.

The field of symphyseotomy, although undoubtedly a legitimate one, is limited not only by the degree of disproportion between mother and child, but also by the size and development of the soft portions of the birth-canal. Experience has shown that symphyseotomy with extraction of the child through a small and ill-developed vagina is attended with greater risk than delivery by abdominal incision. Cases in which the fœtus is in breech presentation are again less favorable for symphyseotomy than are presentations of the vertex. When, however, the degree of disproportion is but moderate and the birth-canal is fully developed, symphyseotomy will save the lives of many children with a minimum risk to the mother.

In selecting delivery by abdominal incision, the operator must choose first between cœlio-hysterotomy and cœlio-hysterectomy. By the former we understand incision of the uterus and extraction of the child, with suture of the uterus, leaving the patient capable of further procreation. By cœlio-hysterectomy is described the removal of the greater portion of the womb, rendering further childbearing impossible. In making this important choice, the wishes of the patient must be consulted. In women of good constitution and happily married few will be found who will not desire to retain their power of reproduction. On the other hand, in married women of feeble strength in circumstances of poverty the burden of childbearing may well be removed. In women illegitimately pregnant and belonging to the class of professional paupers, who are likely to be with their progeny a constant burden on the State, the continuance of reproduction is certainly to be avoided. Most of the latter class have little conception of the responsibilities of maternity, and even if asked to make a choice are incapable of doing so intelligently.

Between cœlio-hysterectomy with intra- and extrapelvic treatment of the stump the difference is great. Improvement in the technique of hysterectomy now enables us to remove the greater portion of the uterus with tubes and ovaries without excessive risk to the mother, and leaving her in a condition favorable for comfortable health. In view of these facts cœlio-hysterectomy with extrapelvic treatment of the

stump is rarely indicated. In cases in which the patient's condition is such that rapidity of operating is of vital importance it must be remembered that cœlio-hysterectomy with extrapelvic treatment of the stump is quickest. The simplicity of this procedure will also render it available for those who have had little experience in obstetric surgery. These advantages are more than counterbalanced by risks of infection owing to the position of the stump, by imperfect control of hemorrhage in many cases, and by tardy convalescence with subsequent interference with the functions of the bladder by the remnant of the uterus left behind. In cases in which abdominal delivery is necessary and future pregnancy is to be avoided cœlio-hysterectomy with intrapelvic treatment of the stump is at present the most desirable form of operation. To illustrate the propositions advanced the following cases are cited:

CASE I. Reported in full before the Academy of Medicine, New York, Section on Obstetrics, April 25, 1895.—The patient is a young colored woman, small and ill-developed, whose height is four feet eight inches, and whose pelvic measurements are as follows:

Iliac spines	23 cm.
" crests	24 "
External conjugate	17 "
True "	7¾ "
Right diagonal	21 "
Left "	20 "
Trochanters	29 "

As disproportion between the head and the pelvis evidently existed labor was induced. After the patient had been in labor twenty-seven hours under good care in the Maternity Pavilion of the Philadelphia Hospital, it was determined to deliver her by abdominal section, because the head had entirely failed to enter the brim of the pelvis. The small size and ill-developed condition of her birth-canal rendered the indications for symphyseotomy not of the most favorable. The patient was without friends, with a family history of tubercular infection, and it was accordingly decided, in view of her illegitimate pregnancy, to make subsequent impregnation impossible. Cœlio-hysterectomy was accordingly performed, the stump being ligated and dropped. With the exception of rapid pulse during the first week of the puerperal period, the mother's recovery was uneventful. The patient nursed her own child, and assisted in nourishing another. She is at present (ten months after the operation) in good health and still nursing her infant.

CASE II.—M. H., aged twenty-three years, was sent to the Jefferson Maternity, May 8, 1895, by Dr. Jennings, of Merchantville, N. J., who measured her, and informed her that her labor would very probably require an operation. Her family history was that of tuberculosis and heart-disease. With the exception of rheumatism, the patient's health had been good. She had a miscarriage at seven months. She was in labor at this time for three days, and was finally delivered, the child dying soon afterward. She was then informed that further pregnancies would be exceedingly dangerous. Upon admission the patient was fairly nourished. An examination of her urine showed that her excretions were fairly well performed. The head of the fœtus was found freely

movable above the brim of the pelvis, the back was to the right, the limbs toward the left and front. The fœtal heart-sounds and position of the fœtus indicated a second position, the occiput pointing posteriorly. The pelvic measurements were:

Iliac spines	23½ cm.
" crests	26 "
Right diagonal	20 "
Left "	20.5 "
Trochanters	30 "
External conjugate	17 "
Vaginal measurement of the internal conjugate given	10 "

The patient had completed nine months' gestation and was within a few days of term. In view of the evident disproportion between mother and child it was thought best to induce labor with the hope that the patient could be delivered by forceps. Bougies were employed under antiseptic precautions, and severe labor-pains with slow dilatation followed. When dilatation became complete the pains were very strong. The head, however, failed entirely to enter the pelvic brim. The resident physician, Dr. L. F. Hess, wisely refrained from rupturing the membranes, and to his good judgment is largely owing the life of the child. In view of the failure of induced labor to bring the head of the child into the brim of the pelvis, I decided to deliver the patient by abdominal section. She was accordingly etherized, the abdomen opened, the uterus incised, and the child and placenta rapidly delivered. The hemorrhage was controlled by the hands of my assistant, Dr. Coles. The child was slightly asphyxiated, but readily resuscitated by Dr. Wells. The patient was then placed in the Trendelenburg posture. A hysterectomy-clamp was applied across the uterus at the lower end of the incision into the womb, and the ovarian and uterine arteries and the broad ligaments were ligated at leisure. The uterus was then resected at the junction of the upper and lower uterine segments. The stump was closed by bringing together the peritoneal flaps and including the subperitoneal tissue with continuous silk sutures. The pelvis was sponged clean, the stump dropped, and the abdomen closed without drainage. The patient's convalescence was uninterrupted. Her temperature was but on one occasion above 100°, and then for a short time at 100.5°. Lactation was performed and the child properly nourished. At the present time the mother is in good health. The stump of the uterus is freely movable and she is still nursing her child. Examination of the fœtus showed the presence of a rhachitic skull, whose diameters were as follows:

Maximum	14.5 cm.
Occipito-frontal	14 "
" -mental	13.5 "
Suboccipital bregmatic	12 "
Bitemporal	8.5 "
Bimastoid	9 "
Biparietal	10¼ "
Trachelo-bregmatic	12 "
Circumference occipito-frontal	33 "
" maximum	34 "
Bisacromial measurement of trunk	13 "
Length	47 "
Weight	4 lbs. 14 oz.

The child has progressed favorably, having gained in weight, and when recently examined mother and child were in good condition.

Case III.—The patient, a colored girl, aged about twenty years, applied during November, 1895, to the Polyclinic Hospital for attendance in confinement. Her pelvic measurements were as follows:

Anterior superior spines	25 cm.
Crests	26 "
Trochanters	29 "
Right oblique diameter	21 "
Left " "	22 "
External conjugate.	17 " plus.

She had then completed the eighth month of gestation, the fœtus being in the usual position, the vertex presenting. Fœtal heart-sounds were heard upon the left side of the abdomen, but less distinctly than normal, although fœtal movements were vigorous.

Upon examining the patient's urine it was found that she was excreting imperfectly, and that she was threatened with toxæmia. She was accordingly given appropriate treatment for this condition. Two weeks after her first coming to the hospital she was taken apparently with labor-pains; examination, however, revealed the fact that the fœtus did not engage, that the membranes were unruptured, and that her pains were not of a violent nature. She was found to be constipated, and was accordingly treated by purgatives and sedatives, when her pains ceased. As she was not under intelligent care at home, she was admitted to the Polyclinic Hospital that an intelligent study of her case might be made. On admission, it was found impossible to bring the head of the fœtus to engage in the pelvis. For this reason labor was not induced, as the disproportion between the head and the pelvis was so great that the induction of labor was not considered justifiable. The patient was given a warm bath daily, the action of the bowels was attended to, and she was kept under observation. She began to have labor-pains on December 15th, although they were not strong, nor did they increase in frequency or strength. As the head entirely failed to engage, dilatation was very slight, and the membranes pressed but very little against the mouth of the womb. It was evident on December 16th that spontaneous labor would not proceed, and that the patient must be delivered by some operative procedure. The vulva and vagina were small and ill-developed, and in view of the small size of the pelvis and of the birth-canal symphyseotomy was declined. It was ascertained that the patient had been leading an irregular life, and that she was without known friends. In view of all the circumstances in the case, it was thought best to deliver her by cœlio-hysterectomy. On December 17th, after suitable antiseptic preparation, with the assistance of Dr. Wells, Dr. Coles, and the resident staff, the patient was placed in the Trendelenburg posture, the bladder emptied by catheter, and the abdomen incised. The abdominal wall was very thin, and the sharp scalpel employed not only opened the abdomen but also made a small incision in the peritoneal coat of the uterus. This was followed by free bleeding, which necessitated the rapid completion of the abdominal incision, the turning out of the uterus, and the prompt delivery of the child. Upon opening the uterus the placenta was found directly beneath the line of incision, and it was observed that the first incision into the uterus, made when the abdomen was opened, had opened a sinus directly over

the placenta; this explained the bleeding, which, however, lasted but for a moment. The child was readily extracted, cried vigorously, and breathed naturally. The time occupied in opening the abdomen and extracting the child was two and one-quarter minutes. The uterus was then clamped by hysterectomy-forceps, the ovarian and uterine arteries ligated, and the uterus amputated at the juncture of the lower uterine segment with the upper contractile portion of the womb. The stump was closed by continuous silk sutures, and the peritoneal edges brought into approximation. There was no hemorrhage, and drainage was not employed. The peritoneum and fascia were then closed by a continuous fine silk suture, and the muscular wall of the abdomen brought together by silkworm-gut. An antiseptic dressing was applied, and kept in place by long strips of adhesive plaster and a flannel binder.

The after-history of the case was uneventful. The patient's highest temperature was 101° for a short time, her average temperature ranging from 99° to 100°. She nurses her child, which has grown naturally. The first dressing was removed sixteen days after the operation, when the stitches were taken out. It was found that the deeper tissues had closed by first intention, and that a few points in the edges of the skin were not in accurate approximation and were closing by granulation. Examination of the child showed it to be at full term, its head well ossified, and slightly larger than the normal skull. It is a male, and has increased in weight in the normal manner. The mother's supply of milk continues abundant.

The after-treatment of these cases, with the mode of dressing employed, is of importance. As the abdomen is closed without drainage, the operator does not expect to interfere with the wound until union has rendered the stitches unnecessary. But one dressing is needed for two weeks after the operation, and that should be the one first employed. After the sutures have been inserted the line of incision should be freely powdered with iodoform or with boracic acid and iodoform, and a thick dressing of antiseptic gauze and cotton placed upon the abdomen. This dressing should be kept in place by strips of adhesive plaster extending entirely over the dressing and upon the patient's thighs and sides. It is better in these patients to dispense with the tapes often employed, which are usually tied over the line of incision. As the incision is a long one, reaching above the umbilicus, it is essential that the patient's abdomen be kept as quiet as possible; hence the value of the adhesive strips which are not readily displaced. Over these strips an ordinary many-tailed bandage of flannel may be applied. In view of the length of the incision, it is well to leave the sutures in place as long as possible. They may remain to advantage for two weeks, at the end of which time the first dressing is made and the sutures are removed. The general care of the patient is that of any puerperal case. The intestines should be emptied within forty-eight hours after the operation, preferably by small doses of calomel, followed by rectal injection of salts and glycerin or of castor oil and turpentine. In other respects the patient's care should be

that of the normal lying-in woman. She should remain upon her back for three weeks before attempting to sit up, and should not stand or walk for four weeks at least after the operation. An abdominal bandage will often be a source of comfort to the patient, although, if union has been good, it is not a necessity.

I desire to call attention to the early history of Mrs. E. H., a patient operated upon at my request by my colleague, Dr. Baer. She has a funnel-shaped and flattened pelvis, whose diameters are as follows:

Anterior superior spines	28 cm.
Crests	30 "
Trochanters	29½ "
External conjugate	19½ "

Palpation of the inner surface of the pelvis reveals marked narrowing toward the outlet. In comparison with the breadth of the patient's shoulders and the width of the iliac bones, it is also found that she has a flattened pelvis. She has been pregnant seven times, her first, third, fourth, and fifth labors being terminated by the use of forceps, with the birth of a dead child. All of these children weighed more than twelve pounds, the first thirteen and one-half. Her second labor terminated spontaneously, a small male child being born, although her medical attendant had sent for assistance to perform an instrumental delivery. This patient came under my observation in January, 1894, desiring the delivery of a living child Her fœtus was in breech presentation, and evidently a large one. She was delivered by me at the Polyclinic by cœlio-hysterotomy, Dr. Baer being present in consultation. The uterus was sutured, and the abdomen closed without drainage. She made an excellent recovery. Her child weighed eleven and three-quarters pounds, and was 52 cm. long; it is living and in excellent health. As the patient is a respectable married woman, her husband living, and as she expressed no wish to avoid further conception, I performed cœlio-hysterotomy as described. Early in 1895 she wrote me that she was pregnant again, and feared greatly the result of her pregnancy. I at once informed her that she could be delivered of a living child, probably without a serious operation, by coming to me in time for the induction of labor. She came to my office early in her pregnancy and was evidently in excellent condition. Her pregnancy was uneventful; she suffered some abdominal pain during the early months, which seemed to be due to possible adhesions between the uterus and peritoneum. This disappeared, however, and she remained in good health. She presented herself at the Jefferson Maternity near the end of her gestation, long after the period assigned for the induction of labor. In my absence from the city, I requested Dr. Baer kindly to take care of the patient. It was her expressed desire that this pregnancy should be her last. This case illustrates, I think, the choice of operation, and the fact that

with patients who are not always obedient to the physician's instructions it will not do to depend upon the induction of labor unless the patient co-operates loyally with the desires of the physician. When asked why she did not return for the induction of labor, she gave her fear of that method of delivery as the reason.

In conclusion, stress must be laid upon the great difficulty which the conscientious obstetrician will experience in choosing the form of delivery most likely to preserve the lives of mother and child. So remarkable are spontaneous births in abnormal cases that the physician must always give nature a chance to accomplish delivery. His attitude, however, must be that of one who delays watchfully and intelligently, and not with neglect. As stated in Cases I. and II., the induction of labor under antiseptic precautions should first be practised when full viability has been attained. In many cases spontaneous birth follows, or at most version or forceps will complete the labor. When, however, it is clearly evident that the fœtus cannot pass through the birth-canal without such injury to mother and child as will jeopardize the lives and health of both, it is the part of wisdom to choose that form of surgical delivery most suited to the condition and development of the mother. Where the child cannot enter the birth-canal the use of forceps is certainly contraindicated, and delivery must be accomplished by symphyseotomy or abdominal incision.

BULLET-WOUNDS OF PERITONEAL CAVITY AND CONTAINED VISCERA.

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The following four cases of abdominal section for penetrating gunshot-wounds of the peritoneal cavity have come into my care. One has been reported already, and is referred to here in order that the series may represent all my work in this direction:

Case I.—W. B., aged thirty years, a strong, well developed man, received a pistol-wound in the right side between the ribs and ileum, the supposed direction of the bullet being across the body, at 4.15 P.M. Sunday, December 2, 1888. He came to University Hospital, and I saw him about 9 P.M. At that time there was no symptom indicating a wound of the abdominal viscera; respiration was normal, the pulse somewhat accelerated, for he had been drinking; abdomen soft. The abdomen was opened by an incision in the linea alba about six inches long, partly below and partly above the navel; operation, 10.30 P.M. There was some blood in the abdominal cavity; five wounds of the small intestine were found and closed by the continuous Lembert

suture; the bullet was recognized within the small intestine near a portion of the bowel which showed a wound. The ileum and lower jejunum were the parts wounded. The abdominal cavity was flushed with boiled water until clean and the incision closed with silk sutures, a drainage-tube being left at the lower angle of the wound. A voluminous dry dressing was applied. During the night the patient tore off the bandages and walked about the ward with the wound uncovered; he was drunk at the time. He was redressed and put back to bed. In the morning it was found that he had again torn off all dressings, and the wound was open and exposed. The following day his temperature varied from 99° to 100°, there was abdominal distention, yet but little pain was complained of; he took small doses of calomel and opium; no stool that day; urine normal. Next day, December 3d, his temperature was normal, his pulse 90, respiration 22, decided distention of the abdomen, the patient comfortable otherwise.

4th. Some vomiting of greenish watery fluid; during the day increased abdominal distention; symptoms of septic peritonitis were plain; little or no discharge from the drainage-tube, which was removed.

5th. Less green vomiting, distention continued, subnormal temperature, no pain. Fecal odor from the wound in the right side was noted, with slight discharge.

6th. No vomiting, an enema producing two stools, no pain, less distention, fecal discharges from the wound in the right side, subnormal temperature.

7th. Vomiting returned, no pain, no distention, temperature 96.5°, one watery stool, great restlessness.

8th. Restlessness continued, temperature normal, pulse 94, respiration 18, no pain, green vomiting.

9th. Vomiting, pain, great restlessness and anxiety, temperature 99°, marked prostration, much sweating, three watery stools during the day, temperature slowly rising. This condition of affairs continued, and he died at 9.05 A.M., December 10th. During the night rectal temperature showed 102.5°, pulse 104, respiration 22. Post-mortem examination disclosed peritonitis in the pelvis and around the track of the drainage-tube, no peritonitis above the navel; the sutured wounds of the intestine healed, were smooth and shining and not adherent to surrounding parts; the sutures appeared to be covered with exudate. The ascending colon showed two perforations close together, closed by lymph toward the peritoneal cavity, open toward the wound in the loin. A shred of cloth lay in the bullet track near the colon. The bullet was found in the small intestine. The cause of death was evidently peritonitis commencing at the seat of the drainage-tube. Whether such peritonitis would have taken place if the dressings had remained on or not it is impossible to say—probably, yes. The patient in the first twenty-four hours pulled off the dressings twice, being about the ward, as well as in bed, with the wound entirely uncovered. In closing the bullet-wounds the edges were brought together so that the scar was placed transversely in respect to the long diameter of the bowel. Distention of the gut did not, therefore, tend to separate the wound-edges or cause the sutures to tear out. So well was I satisfied with the behavior of the wounds when thus sutured, that I have followed the same method in subsequent cases.

CASE II.—William K., aged twenty-two years, white, male, was seen

by me with Dr. Tall, March 1, 1894. He had received a pistol wound while talking with a friend three hours before I saw him. The wound was to the right of the linea alba, about two inches and a half above the navel. The direction was said to be downward and toward the left. He was seen at his house; he rested on his side, was suffering much pain, and complained a good deal; he referred his pain to the abdomen generally, the walls of which were stiff and hard; pressure elicited much complaining. The surroundings not being favorable for the operation, he was sent to the University Hospital, and I operated as soon as preparations could be made. The abdomen was opened very freely in the middle line. I found eight perforations of the small intestine and four wounds of the mesentery. The former were closed by Lembert suture; vessels in two of the latter bled freely; they were ligated, but no attempt was made to suture the mesenteric wounds. Blood and feces were in the peritoneal cavity, which was freely flushed with boiled water until everything was clean. The patient was put to bed after operation, with a temperature of at most 95°, that being as low as the thermometer would mark. Food was withheld, cracked ice only being allowed the patient. By the following morning the temperature was normal. For the next three or four days cracked ice only was allowed to assuage thirst. Sutures were removed on the ninth day and some stitch-abscesses found. The convalescence which followed was interrupted on the twenty-second day after the injury by an acute attack of dysentery that lasted three days, but which yielded to treatment. The patient returned home well, with firm abdominal walls and no hernia, in May. He was directed to wear an abdominal support for at least one year.

Case III.—"Gunshot-wound of the spleen and kidney, abdominal section, hemostasis by deep suture, recovery." Read before the Southern Surgical and Gynecological Association, 1894. Published in the *Medical News*, 1894, vol. lxv., p. 546.

Case IV.—Charles F., aged thirty-nine years, white, male, German immigrant, married (one child), good family history and of good habits, shoemaker by trade, came under my care at University Hospital.

On April 7, 1895, 2.30 A.M., he received a pistol-wound three inches from middle line and two inches below the margin of the right ribs. Dr. Spruill, resident physician, enlarged the opening, recognized that the bullet had entered the abdominal cavity, closed the wound with gauze lightly, and notified me. I saw him at 4 A.M. Decubitus dorsal. There was some dulness in the right flank. Before entering the hospital the patient was reported to have vomited, the nature of the vomit, however, could not be known; the presence of blood in the vomit was denied. Urine was found to be normal. There were no indications of wound of any abdominal organ. Shock was not marked; the abdominal walls were not unduly firm, and there was no tenderness on pressure. The belly was opened by an incision from the wound directly downward through the right rectus muscle, about seven inches long, the wound being parallel with the linea alba and two inches away from it. The epigastric artery was about parallel with the wound and was cut two or three times and ligated—of course, where cut. The right side of the abdomen contained clots and fluid blood, which were cleared away. The bullet had passed through the right lobe of the liver. There was bleeding from both upper and lower openings. The stomach showed two

openings where the bullet had evidently gone in and out. The wound of exit was under the spleen in the greater curvature of the stomach. The omentum showed evidence of injury, some blood being extravasated in it; the transverse and descending colons were lifted out and carefully examined. Except the injury to the omentum, nothing was seen; no wound of the small intestine was discovered; the bullet was not found; the wounds of the liver, both upper and lower, were tamponed with gauze, the ends of the same being brought out at the upper end of the abdominal incision. The holes in the stomach were closed with Lembert sutures, silk being used; the abdominal walls were brought together, save where the gauze from the liver was given exit. A voluminous dressing of gauze and cotton was applied and the patient put to bed. After passing from under the influence of the anæsthetic the patient showed signs of shock; the same day, five hours later, the temperature was 97°, pulse 92, and respiration 28; the same evening the pulse was 120, respiration 28, and temperature 99⅘°. Pain was complained of the same afternoon. Rochelle salt was given in teaspoonful doses every hour. With the first stool, which was after the second dose of salt, the patient passed the bullet. It became thus plain that the bullet had entered the descending colon beneath the spleen, where the omentum was wounded. Purgatives were withheld and morphia was given hypodermically, one-quarter grain every three hours. The temperature varied from 101.5° to 99.5° for five days. On the 12th the sutures were removed and the first outside dressing changed. The liver packing was not, however, disturbed. On the 13th the gauze was withdrawn from the liver-wounds, being soaked with bile. After this, bile flowed in large quantity into the dressings; the bowels became constipated and such stools as could be gotten, by enema or doses of Rochelle salt, were colorless. Five grains of ox-gall were given every two hours in compressed tablets. On the 14th and afterward enemata of sulphate of magnesia were made use of to empty the bowels. On the 18th phlebitis of the right lower extremity took place, but was not very marked. The dressings were changed twice daily and were filled with bile; the patient's complexion was mottled and his tongue dry. From the 21st to the 26th symptoms of consolidation at the base of the right lung were apparent. A firm yellow stool was passed April 23d; from May 1st well-formed yellow stools were passed daily; the amount of bile in the dressings gradually diminished from this time, until, finally, the abdominal wound healed, the patient's color returned, and he went out well June 19, 1895.

In the preceding cases it will be noticed, among other things, that twice the bullet lodged in the bowel, penetrating one wall and not going through the other—Cases I. and IV. In the other two cases the bullet was not found, lodging probably in the soft parts; no harm resulted from such lodgement. Had a large vessel been wounded, as an iliac artery or vein, evidence of the existence of such a wound would, of course, have called attention to the presence of the bullet. In the absence, therefore, of any symptom pointing directly to the lodgement of the bullet, after the intestinal wounds, etc., had been attended to, no further search was made for the bullet and no harm resulted. Save in

Case II. there were no symptoms when first seen indicating injury to the abdominal viscera. In Case II. there was some pain on pressure, and very marked rigidity of the abdominal muscles. There existed eight perforations of the small intestine. In this case it may be that extravasation from the bowel into the peritoneal cavity had to do with the amount of pain on pressure and rigidity of the abdominal muscle. No case showed blood, or feces, or gas making exit from the bullet-wound. Temperature, pulse, and respiration were unchanged. Indeed the most noticeable thing, when looked at after operation, was that there was nothing to indicate the amount of intraperitoneal lesion until the abdomen was freely opened; then, of course, everything became plain. This fact has been again and again referred to by writers, and is justified by the present series of cases. A surgeon who withholds operation until symptoms indicating the necessity therefor appear will withhold operation until it is too late, and the patient will have already passed, in many cases, beyond the path leading to recovery, for sepsis and peritoneal inflammation will have already started and made fatal progress. Conner, in *Dennis's Surgery*, vol. i. p. 454, quotes Redard as saying that a temperature of 96° Fahrenheit indicates very severe injury, and that an operation will not be followed by recovery. The cases here reported unquestionably show that with normal temperature a fatal injury (without operation) may be present, while after operation a subnormal temperature may be expected, 95° being recorded.

Hemorrhage from the liver, Case IV., which was free, was arrested by gauze-packing, and proved quite as effectual as deep sutures could have done, while it afforded an exit for the bile, which subsequently flowed in great quantity. It is to be noted that the gauze was not removed for nearly a week, by which time an excellent track of lymph had been formed from the liver to the abdominal wound, which was closed except at the top; hence the bile found easy exit from the body rather than into the peritoneal cavity, which route would have been followed had not gauze been used. This seems to justify the opinion that gauze-packing in liver-wounds is safer than suture. The mesenteric vessels were tied. As soon as the abdomen was opened and blood sponged away, blood from the mesenteric vessels spurted instead of oozed; whether this was due to the removal of the abdominal pressure by incision through the belly-walls, or as a result of sponging away the clots, it is difficult to say; but the fact remains that the oozing vessels became spurting vessels.

The splenic wound is sufficiently spoken of in the article quoted, and requires no mention here.

The absence of shock perhaps is as noticeable as anything else.

In the *Southern Surgical and Gynecological Transactions*, vol. vi. p. 183, the late Dr. A. B. Miles, of New Orleans, expresses "inability, by the

general symptoms, to recognize the extent of the traumatism within the peritoneal cavity. In a case with fourteen perforations of the small bowel the man had a pulse of 66, full and good, and we were attracted by the excellent condition of the patient on the operating-table; he did not appear to be shocked, and it was the observation of all present that the man's fair condition gave not the slightest indication of the gravity of the wounds within. . . . . Again, some patients are so shocked by the occurrence in which they receive their injury that they seem extremely depressed by the result of simple accidents. At this moment I have in mind the case of a man brought into one of the surgical wards of the Charity Hospital with an external wound. He was lifted to bed absolutely helpless, and we thought he had a serious gunshot-wound of the abdomen. The man himself feared death was imminent. On examining his clothes we found the bullet in the leg of his drawers, showed it to him and told him to get up and go home, but he was unable to get out of bed for hours. So far as my individual experience goes, I have never been able to diagnosticate with precision the gravity of the conditions within the abdomen by the appearance of shock. Up to this date, November, 1893, I have operated on fifteen cases, and I have saved six patients. Among these, one man had sixteen wounds of the small intestine, one fourteen, one ten, and a woman had eight. These four cases surely would have died by the old plan of tentative treatment."

Cases I. and IV. are examples of unsutured gunshot-wounds of the large intestine, one recovering and the other dying, death not being the result of the wounded colon. In this latter, Case I., the patient died from infection at the seat of the drainage-tube, which may or may not have taken place had he permitted his bandages and dressings to remain in position; but it may be considered quite certain that it would have been much better to have left in no drainage-tube at all and to have closed up the whole abdominal wound, so that even if he had torn off the bandages there would not have been a free way into the peritoneal cavity for infection, as there was.

In the second case there may be some excuse for not discovering the colon-perforation. First of all, and most important, the man recovered. Secondly, the colon at the wounded place was withdrawn from the peritoneal cavity, laid on the belly-wall and carefully examined for the bullet-wound, which must have been at that part of the gut where attached to the omentum, yet it was not discovered. No wounds of the small intestine remained unsutured.

The rapidity with which the operation is to be done is, of course, a matter of importance; but speed is secondary to thoroughness, and a finished operation, even though slow, is superior to a rapid and incomplete one, for evident reasons. In the cases reported, after operation the temperature was extremely low, the patients being in condition of

profound shock, as would be natural after handling the bowels, withdrawing them from the peritoneal cavity, etc.

It was repeatedly noticed that flushing the open belly with hot water always produced a most excellent effect upon the pulse, which not only increased in volume and force, but diminished in rapidity.

In Cases III. and IV. the bullet-wound of entrance was enlarged, and it was recognized that the bullet had entered the peritoneal cavity. Had the same thing been done in Case I. good would have resulted, and the colon-wound would have been discovered. The wound of entrance should be explored by incision, and the subsequent treatment will be largely guided by the result of such examination. Median abdominal section gives the best access to the peritoneal cavity, and would seem preferable, unless there are indications to the contrary.

Food, after operation, was withheld, cracked ice only being given; in one case for eight days.

Purgation by salines is to be had recourse to, unless there is reason to suspect that an unclosed bowel-wound exists, when opium will be found more serviceable, should it be deemed not best to reopen the abdomen and search for the wounded bowel.

The following propositions seem to be justified:

1. A penetrating wound of the peritoneal cavity is not accompanied by symptoms commensurate with the extent of the injury.

2. Many fatal lesions may be present, yet give rise to no marked symptoms.

3. Fatal lesions may exist, yet shock be wanting.

4. The wound of entrance should be enlarged, and, if the missile have entered the abdomen, a section is called for.

5. Operation is proper soon after the injury, before the peritoneal membrane has become infected, or much blood lost.

6. Flushing the open peritoneal cavity with hot water or hot, normal salt-solution is an excellent stimulant to the heart.

7. The abdominal wound should be closed when practicable without drainage.

A CONTRIBUTION TO OUR KNOWLEDGE OF ALBUMOSURIA.

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When albumin was first discovered in the urine and correctly referred to a diseased kidney as its antecedent, a great advance was made in our means of diagnosis.

At first all albumins were considered alike, and to find albumin in the urine meant but one thing, namely, disease of the kidneys. More extensive observations soon demonstrated, however, that many conditions gave rise to albuminuria other than disease of the kidneys, and, furthermore, that there are several kinds of albuminoids or proteid bodies that may appear in the urine.

These proteid bodies we may divide into four classes:

1. Coagulable proteids, such as serum-albumin, globulin, fibrinogen, etc.
2. Nucleo-albumin.
3. Albumoses or proteoses.
4. Peptones.

It is only with the albumoses and peptones that we have to deal.

Owing to the great confusion and contradictions which exist in the literature of this subject, on account of a failure properly to recognize and differentiate these two classes of proteids, it will be necessary before proceeding further to define what we mean by albumose and peptone.

If a solution of a native protein, as egg-albumin or fibrin which has partly undergone digestion, be treated to saturation with pure ammonium sulphate at the boiling-point after the method of Kühne,[1] a heavy precipitate will occur. After cooling and filtering we obtain a perfectly clear filtrate, which we find, upon applying the biuret-test, still contains a proteid body.

It is to this end-proteid of digestion that Kühne has applied the term peptone, and the term peptone should be strictly limited to this particular proteid. If we now examine the precipitate which has collected on the filter, we shall find it composed of two portions, one, the remains of our native proteid which has not yet been acted upon by the digestive agent, and which has been coagulated and rendered insoluble, and the other which is readily soluble in water or dilute sodium chloride solution. To this soluble portion the name albumose or proteose is given.

It is not a single product, but several products which can be still further separated, and represents the various steps or stages which intervene between the native proteid and the end-proteid, peptone. There are probably almost innumerable albumoses varying slightly according

to the particular native albumin from which they are derived and the antecedents leading to their formation.

Since these substances have been found in the urine many tests have been proposed for their detection. Owing to the error of mistaking albumose for peptone some of these tests are incorrect, some are too complicated or require too much time for practical clinical use, while others are not delicate enough to detect it when present in only minute quantities.

The one characteristic of peptone is that it is not precipitated by complete saturation with ammonium sulphate; hence if the biuret-reaction shows in the clear filtrate of an ammonium sulphate saturated urine, peptone is certainly present, but in applying this test there are many difficulties. In the first place, the last traces of albumose are very difficult to precipitate from solution. According to Kühne, the solution must be rendered successively neutral, alkaline, and acid, with prolonged boiling after each change in reaction. This is time-consuming.

Then the coloring-matter of the urine interferes materially with the delicacy of the reaction, and the reaction fails altogether when peptone is present in only minute quantities.

The characteristic reactions of albumose as given by Munk[2] are:

1. Not precipitated by boiling.

2. The careful addition of cold nitric acid produces a precipitate which dissolves with a yellow color on boiling, to reappear again on cooling.

3. The addition of acetic acid and double the volume of concentrated salt-solution gives in the cold a cloudiness or precipitate which clears on boiling, to reappear on cooling.

4. The ferrocyanide-test produces a cloudiness or complete precipitation.

5. Precipitation on saturation with neutral ammonium sulphate.

6. The addition of tannic and acetic acids or phosphotungstic acid solution produces cloudiness or precipitate.

7. Biuret-reaction.

Of these reactions Nos. 4, 5, 6, and 7 likewise precipitate the ordinary albumins, and No. 7 reacts to peptone; consequently none of these is of value in differentiating albumose.

No. 1 is simply negative, while Nos. 2 and 3 are not sufficiently delicate and are valueless in the presence of other albumins.

Thus, while the above reactions are characteristic of albumose, none of them is applicable to the detection of small quantities in the urine.

The methods most commonly used in the detection of peptone (albumose) in urine are those of Hofmeister and Devoto, as described by v. Jaksch.[3]

Hofmeister's first method with acetic and phosphotungstic acids, as

he states, only holds good where the urine contains a considerable amount of peptone. Furthermore, other albumins must first be removed or excluded.

Hofmeister's second method, phosphotungstic and hydrochloric acids, washing with sulphuric acid, then with water, rendering alkaline with barium carbonate, heating from ten to fifteen minutes on a water-bath at the boiling-point, then applying the biuret-test, is not characteristic of peptone, albumose reacting as well. Albumins must first be precipitated with an iron salt, which likewise precipitates some of the albumoses.

The method is unreliable and altogether too long and complicated for practical clinical use.

Devoto's method as described by v. Jaksch is erroneous, as it is stated there that saturation with ammonium sulphate precipitates peptone and the peptone is searched for in the precipitate. Peptone, of course, would not be precipitated at all, and any reaction obtained would be due to albumose.

The method, however, is not delicate enough, and the coloring-matter of the urine interferes materially with its application.

Concerning Hofmeister's method Shore[4] says: "An excess of FeCl leads in the end to a colored fluid, which interferes with the biuret-reaction, while with too little the complete precipitation of the proteids is not secured. If the solution be too acid, the subsequent heating may lead to the formation of some peptone by the action of acids upon albumins and globulins. The solution, however, must be left acid, otherwise the proteids are not precipitated.

"Albumoses are not removed, and the complete removal of other proteids is not readily secured."

The other tests which have been recommended are either too complicated or not delicate and reliable enough for practical clinical use. Such was the state of the subject some two and a half years ago when I began investigating the question of so-called peptonuria, and, after many failures and much dissatisfaction, I gave up the older methods and endeavored to find some test more delicate and reliable that could be applied in practical clinical work.

After much investigation and experimentation I am able to present a method which is so simple that any one at all familiar with the most ordinary laboratory technique can apply it, and so delicate that one part of albumose or peptone in 50,000 parts of urine may be readily detected.

I agree with Stewart,[5] Posner,[6] and others, that normal urine always contains a minute trace of an albuminoid body (probably nucleo-albumin), and as this as well as other albumins, serum-albumin, globulins, etc., react to the agents here employed the urine must first be freed from

the last trace of all coagulable albuminoids before testing for albumose or peptone.

This is accomplished as follows:

To 20 c.cm. of (acid) urine* in a test-tube are added six or eight drops of a saturated solution of salicyl sulphonic acid in distilled water, and 1 grm. of plumbium chloride. Shake well and boil about thirty seconds. Cool by shaking in running water from the cold-water tap.

Filter through ordinary clean, white filter-paper until the urine is clear. Now add a few drops of a clear, saturated solution of sodium sulphate in distilled water, in order to precipitate what lead is held in solution; raise to the boiling-point, and cool under the cold-water tap as before.

Filter again until clear. We should now have a perfectly clear urine, absolutely free from every trace of coagulable albuminoids, including nucleo-albumin, in which we may search for albumose or peptone. This clear filtrate is divided into three equal portions, and placed in test-tubes, one of which is kept for comparison, the other two for further analysis.

To one of these are now added three or four drops of a saturated solution of salicyl-sulpho-tungstate of sodium in distilled water.†

If albumose or peptone be present, a cloudiness will appear, varying in degree according to the amount of these proteids present.

As the amount of albumose present is often very minute, it may be necessary to compare the tube with the control-tube in order to detect the cloudiness.

The cloudiness disappears entirely on gently heating the test-tube, to reappear on cooling.

To the third tube the test is varied by allowing about 5 c.cm. of a dilute solution of the salicyl-sulpho-tungstate of sodium (made by adding about ten drops of the strong solution to 5 c.cm. of distilled water) to flow very gently down the side of the tube, so as to rest on the urine as a separate layer.

This should be very carefully done so the line of contact will be sharp and clear-cut, not diffuse. A cloudy line appears at the point of contact of the two liquids if albumose or peptone be present.

When the amount present is very small it may take two or three

* The urine must be fresh. If it must stand several hours before it can be examined, it should be preserved from the growth of bacteria in it by the addition of some antiseptic, preferably a few drops of formalin, which will keep it several days, and does not interfere with subsequent tests.

† Salicyl-sulpho-tungstate of sodium is prepared as follows:

To a boiling saturated solution of tungstate of sodium in distilled water salicyl-sulphonic acid is gradually added, under constant stirring, until the solution no longer turns red litmus blue; or, in other words, until the alkaline tungstate of sodium is completely neutralized. Upon cooling the salicyl-sulpho-tungstate of sodium crystallizes. A solution is now made of this in cold, distilled water and filtered. A perfectly clear, colorless fluid results.

minutes for the line to develop, and shows best, the two liquids being clear, when held in front of a dark background.

As before stated, this test is extremely delicate, 1 part in 50,000 being readily detected; it is simple, and can be easily applied in fifteen to twenty minutes.

Owing to the delicacy of the reactions it is necessary that all test-tubes be absolutely clean and the test-solutions perfectly clear, otherwise a slight reaction may be easily overlooked.

The sodium sulphate solution must be added in slight excess in order to insure the precipitation of all lead, as any lead left in solution would be precipitated by the salicyl-sulpho-tungstate of sodium, and thus interfere with the test.

This would be easily recognized, as the cloudiness in that case would not disappear on heating, but become more marked.

The boiling during the application of the test, while not absolutely necessary, very materially facilitates the reactions and should always be done. The cooling, after boiling and before filtering, must never be omitted.

If these few simple points be carefully observed, no difficulties will be experienced in applying the test.

We now come to the second part of our subject, namely, the origin of these albumoses and the clinical significance of their presence in the urine.

The early writings on the subject of so-called peptonuria by Gerhard,[7] Senator,[8] Obermüller,[9] and others were made at a time when the knowledge of peptone was so imperfect that they have for us but a historical value.

Our first real knowledge of this subject dates from Hofmeister[10] and Maixner,[11] and the method of analysis described by Hofmeister is the one which has been most commonly employed up to the present time.

These observers found what they supposed to be peptone in the urine in many diseases in which pus-formation and pus-accumulation play the chief *rôle*.

The apparent connection between the presence of peptone in the urine and the formation of pus led Maixner to suppose that the peptone had its origin in the pus-accumulation.

This supposition was very much strengthened by Hofmeister, who found, upon examining pus by the same method he used in examining urine, that pus contained an unusually large percentage of peptone, and, furthermore, that the peptone was not in solution in the serum, but was held chemically or mechanically by the pus-cells themselves, and that pus-accumulations could only give up peptone to the blood and thus to the urine when pus-cells in large numbers were destroyed. These two authors thus considered peptonuria to be a symptom of the

destruction or breaking down of pus-cells. V. Jaksch[12] was the next to investigate the subject of peptonuria. He made a large number of examinations after the method of Hofmeister in 354 patients, and in only 76 of these was peptone present for a longer or shorter time. In all but 4 of these cases could the peptone be referred to an inflammatory process or a pus-accumulation. V. Jaksch agreed with Hofmeister that the pus-cells must be destroyed in order to set the peptone free, before it could appear in the urine, and that the amount of peptone in the urine goes hand in hand with the degree or rapidity of absorption of the exudate. This form of peptonuria was, therefore, called the pyogenic form. V. Jaksch found peptone in a patient suffering from scurvy, and as there was no pus present here he considered it due to the destruction of the white blood-cells in the bloodvessels, designating it the hæmatogenic form.

Maixner,[13] in a further communication, reported the finding of peptone in the urine of 12 cases of cancer of the stomach, and in 5 out of 9 cases of typhoid fever.

As he could not attribute the peptone in these cases to the presence of a pus-accumulation, he considered it due to changes in the mucous membrane of the stomach and intestine, thereby permitting the absorption of this product from the digestive tract, and, therefore, called it the enterogenic form.

About this time Fischl[14] called attention to the fact that peptonuria was an almost constant accompaniment of the puerperal state.

He found that before confinement and during the first twelve hours after delivery the urine was free from peptone; it began, however, to make its appearance during the second half of the first day, and during the second and third days was almost constantly found—twenty-four times out of twenty-five. On the fourth, fifth, and sixth days it was present thirty-seven times out of forty-four; from the seventh to the tenth day, in only a few of the cases; while after the tenth day it was very seldom present.

He considered the peptonuria due to the puerperal state and caused by the rapid absorption of albuminoids during involution of the uterus.

He reasoned, if the peptonuria was due to the absorption of albuminoids from the involuting uterus, it would not occur after Porro's operation. He, therefore, examined the urine in a case of Porro's operation, and found no peptone up to the sixth day. This he considered established his point, but the fallacy of his reasoning will be apparent. Fischl likewise examined the lochia, and found peptone in it at times, but did not think it had anything to do with the peptonuria, because he found peptone in the urine when he did not find any in the lochia.

Peptonuria was at one time thought to indicate the death of the fœtus in utero, but this was soon disproved.

Pocanowski[15] in an elaborate paper on this subject presented the following formidable list of diseases in which he, using the method of Hofmeister, found peptone in the urine:

Typhoid fever, intermittent fever, typhus fever, variola, scarlatina, mumps, miliary tuberculosis, erysipelas, acute, chronic and muscular rheumatism, phthisis pulmonalis, croupous pneumonia, chronic pneumonia, empyema, embolism from heart-disease, angina faucium, carcinoma of the œsophagus, stomach, rectum, liver and uterus, perityphlitis, catarrhal icterus, cirrhosis of the liver, parametritis, apoplexy, abscess, and post-traumatic ecchymoses.

A glance at this long list of diseases will show at once the fallacy of attempting to attribute peptonuria to the absorption of broken-down pus-cells from a pus-accumulation.

Up to this time, as will have been noticed, nearly all the investigators employed the method of Hofmeister in their examinations. The appearance, however, in 1886 of Kühne's[16] article on albumose and peptone threw an entirely new light on the subject.

By the use of ammonium sulphate, first proposed by Wenz, Kühne was able to differentiate true peptone from the albumoses, and as Hofmeister's method failed to do this, it became necessary to reinvestigate the entire subject of peptonuria by the method of Kühne.

Thompson[17] was one of the first to employ this method.

He examined the urine of women during pregnancy and after confinement by saturating it with ammonium sulphate and applying the biuret-test to the clear filtrate. While admitting that deutero-albumose was not completely precipitated by this method, still he considered it proper to call any albuminoid which remained in the urine after saturation with ammonium sulphate and gave the biuret-reaction, as peptone. From his examinations he concluded:

1. That peptonuria is not characteristic of the pregnant state.

2. It is not a symptom of the death and maceration of the fœtus.

3. Peptonuria may occur after confinement, but is not constant.

Stoffregen[18] precipitated with ammonium sulphate, and after concentrating the clear filtrate used the biuret-test or tannic acid.

In 16 cases of pregnancy, 5 puerperia, 10 of phthisis pulmonalis, 2 of typhoid fever, 2 of croupous pneumonia, 1 of sepsis, 3 of tuberculosis, 1 of inflammation of the knee-joint, 1 of peritonitis, 4 of empyema, 4 of carcinoma, 2 of pyosalpinx, he obtained a negative result in all, except one puerperal case, in which he found peptone on the second, third, and fourth days, which he attributed to a failure to saturate completely with the ammonium sulphate.

Le Soir[19] saturated with ammonium sulphate, boiled fifteen minutes, filtered, concentrated to one-tenth, decolorized with plumbium acetate, and then tested with the biuret and tannic acid.

In 4 cases of scarlatina, 2 of measles, 3 of diphtheria, 3 of pneumonia, 1 of pleurisy with effusion, 1 of perityphlitis, 1 of tubercular abscess of the hip, 1 of compression-myelitis, 1 of transverse myelitis, and 1 of tubercular meningitis, all gave a negative result. By the same method of examination he could find no peptone in fresh pus. In pus, however, which had been exposed to the air for ten to fourteen days he found peptone. He concluded, therefore, that the urine might contain peptone in cases in which a pus-cavity had been long exposed to the air.

If now we compare the results obtained by Hofmeister's method with those obtained by later methods, after Kühne had differentiated true peptone from the albumoses by the use of ammonium sulphate, we find that they do not at all agree.

In the same class of cases in which Hofmeister found peptone, no peptone whatever could be found by Kühne's method. In fact, repeated, careful examinations have shown that true peptone in the sense of Kühne has never as yet been found in the urine, and that the products heretofore considered peptones by Hofmeister and others were not peptones, but belong to the class albumose.

This means, as Noordan[20] says, not that all the earlier observations are erroneous and valueless, but that the term albumosuria must be substituted for the term peptonuria.

Furthermore, the entire subject must be re-investigated by more delicate and approved methods with this knowledge before us.

By my method herein described I have made many hundred examinations of urine in a great variety of diseases, and have found products corresponding to the class albumose or proteose in the following conditions:

All kinds of suppurative conditions, acute and chronic, such as pelvic abscesses, appendicular abscesses, peritonitis, suppurative lymphadenitis, subcutaneous suppuration, osteomyelitis, etc.; and in the following infective diseases which I have had an opportunity to examine:

Acute croupous pneumonia, *la grippe*, phthisis pulmonalis, diphtheria, typhoid fever, syphilis (one case secondary stage), and one case of septicæmia of unknown origin.

It will thus be seen that albumoses are found in the urine in a great variety of conditions, and this brings us to a consideration of the origin and clinical significance of this class of proteids.

When Hofmeister and Maixner found peptone (albumose) in the urine in so many conditions, accompanied by the formation and accumulation of pus in the body, and when Hofmeister stated that peptone was not contained in the pus-serum, but in the pus-cells themselves, it was concluded that the peptone arose from the disintegration of the pus-cells, when it was taken up by the blood and eliminated by the kidneys.

When v. Jaksch found peptone (albumose) in the urine in scurvy where there was no pus formation, he concluded it must be due to the rapid destruction of leucocytes in the blood.

When peptonuria was found in some cases of cancer of the stomach and in ulcerative conditions of the intestine it was considered that the peptone was absorbed unchanged by the denuded and ulcerated surfaces from the stomachic and intestinal contents during the process of digestion.

These forms were called respectively pyogenic, hematogenic, and enterogenic peptonuria.

The conditions in which peptonuria was found now began to increase quite rapidly, particularly in such conditions as were not accompanied by pus-formation, for instance, in scarlet fever, measles, and other infective diseases. Here the existing explanations were entirely inadequate. There was no disintegration of pus-cells, no rapid destruction of leucocytes, no denuded surface in the alimentary canal permitting the possible absorption of peptones during the process of digestion.

The normal blood and lymph contain no albumose or peptone.

These products formed in the alimentary canal during the process of digestion are re-converted into other forms of albumin in their passage through the epithelial cells of the intestinal mucosa, and are not to be found in the blood or lymph.

Hildebrandt's statement that peptone is taken up by the lymph-cells in the intestinal follicles has not been sustained, and Shore[4] has shown that neither the lymph nor the lymph-cells are capable of taking up or converting a particle of peptone or albumose, and that these substances when injected into the lymph-system can all be recovered from the urine.

Neumeister[21] says that albumose and peptone, when injected subcutaneously or directly into the blood, invariably act as foreign bodies, and are eliminated as quickly as possible, and, furthermore, that the entire amount injected may be recovered from the urine.

These facts show conclusively that albumose, when present in the blood and urine, is an abnormal constituent of new formation.

When we consider the various conditions giving rise to albumosuria there is one striking fact which is common to them all, namely: they are infective conditions due to the presence of known or unknown micro-organisms.

This fact impressed itself upon me early in my investigations, and I determined, if possible, to learn whether the various micro-organisms during their growth gave origin to or produced albumoses which might find their way into the blood, and thus appear in the urine.

It was first necessary to secure a culture-medium free from peptone and albumose.

The ordinary peptone of commerce is composed chiefly of albumoses, and as the usual culture-media are prepared with this they were unsuited to our purpose, as it would be impossible to determine what albumose had been artificially added, and what, if any, had been produced by the growth of the microbes. I finally struck upon hydrocele-fluid, which is rich in albuminoids, similar to the normal fluids of the body in which the micro-organisms grow when infection occurs. A supply of the fluid was obtained from my surgical clinic at the Polyclinic. It was drawn into sterile flasks, under aseptic precautions, and analyses of it showed it to be absolutely free from any trace of albumose or peptone. A number of test-tubes were prepared with the fluid, and several of them were inoculated, respectively, with pure cultures of staphylococcus pyogenes aureus, streptococcus pyogenes, and bacillus coli communis. A quantity of the fluid was likewise left exposed to the ordinary saprophytic organisms of the laboratory air.

Owing to the well-known slight germicidal action of fresh hydrocele-fluid it is necessary to inoculate quite freely in order to insure a growth, as a few organisms will be destroyed before growth takes place. Cultures of the three varieties of microbes inoculated were obtained, as well as of the unidentified saprophytes of the air. The contents of all tubes in which growth occurred were now carefully analyzed and albumose found in all of them without exception. As no albumose was found in control-tubes, nor in tubes in which no growth occurred, we must conclude that the albumose was produced directly by the growth of the micro-organisms. The albumose is not an excretion of the microbes, but is produced by the digestive action of the organisms upon the albuminoids (serum-albumin, globulins, fibrinogen, etc.), present in the fluid. Kühne[22] has likewise shown that albumose is due to the direct action of micro-organisms upon albumins. He found that tubercle-bacilli growing in an albuminous fluid produce albumose; but if no albumin be present in the culture-medium, no albumose whatever is formed. He has also shown that the hay-bacillus and bacillus prodigiosus are capable of converting proto-albumose into peptone. Hankin[23] found that the substance formed by the growth of anthrax-bacilli was a veritable albumose, while Sidney Martin,[24] by growing anthrax-bacilli in a pure solution of alkali-albuminate prepared from blood-serum, proved the formation of both primary and secondary albumoses as well as peptone and other cleavage-products.

Brieger and Fränkel[25] have obtained with the diphtheria-bacillus albumose-like bodies which were endowed with powerful poisonous properties. Chittenden[26] obtained albumoses, peptone, and crystalline bodies with the bacillus of glanders grown in alkali-albuminate. Robitschek[27] found that typhoid bacilli produce peptone (albumose) when

cultivated in peritoneal fluid, and suggested the possibility of a bacterial peptonuria. Debraye and Legrain[28] state that urine containing albumin, if allowed to stand for some hours subject to the action of the ordinary saprophytic organisms of the air or the bacteria of the urethra, will show the presence of peptone (albumose), this being due to the action of the organisms on the albumin. The production of toxalbumins by the growth of different micro-organisms in various media has been studied by numerous other observers, and these toxalbumins have been found to correspond in their chemical reactions, etc., to the great class of proteoses or albumoses. Chittenden (*loc. cit.*) says "It is thus evident there is ample ground for the statement that all nutritive media in which pathogenic bacteria have been planted are liable to contain sooner or later toxic substances, many of which at least are closely related to if not identical with the albumoses."

Kühne has designated all of these peculiar albumoses of bacterial origin acroo-albumoses. They are endowed with marked chemical and physiological properties, causing a rise of temperature when injected into the blood, as well as other phenomena more or less pronounced. It is a well-known fact that before any organized body can assimilate or appropriate to the building up of its own structure albuminous matter, this must first be converted into more soluble forms. This process of conversion of albuminoids is called digestion. From our own experiments and those of numerous other observers herein mentioned, showing the power of micro-organisms to convert or digest albumins, and from the fact that from man down to the lowest form of animal life all possess this power of digesting albumin, we are justified in the conclusion that this digestive power, or, as it is sometimes called, peptonizing power, is one common to all forms of living organized bodies. The proteoses or albumoses are primary products, as Chittenden says, in the digestion of every form of proteid matter intermediate between the mother-proteid and the peptone, and that we have to deal not only with a number of bodies superficially unlike, as the primary and secondary proteoses or albumoses and peptones, but these bodies may show marked variations in structure dependent upon the exact conditions attending their formation.

The origin of the albumoses in the urine is now readily seen. Micro-organisms invading the body develop in the rich albuminous fluids and tissues. In order to be able to appropriate the albumins to their own growth they digest them, thus producing the various albumoses. Here, as in the higher forms of life, we find much larger quantities digested than are assimilated. The albumoses being very diffusible, as soon as formed the excess is readily taken up by the blood and eliminated by the kidneys, thus appearing in the urine. The digestive activity of the

different organisms varies considerably. At one time we find large quantities of albumose in the urine, again only the slightest trace. The amount of albumose present in the urine in any particular infection is to a certain extent an indication of the activity and severity of the disease. As, for instance, in a very severe case of typhoid fever in which death occurred at the end of the first week with symptoms of the most profound toxæmia, the urine contained relatively a large amount of albumose. The quantity obtained from about 20 c.cm. of the urine was filtered out, carefully washed with dilute sulphuric acid, redissolved in very slightly alkaline distilled water, and injected hypodermatically into a grown cat. In an hour the cat presented marked symptoms of intoxication, with elevation of temperature, from which, however, it recovered completely in a few hours. In typhoids running a milder course the quantity present is relatively less.

In regard to the clinical significance of albumosuria little additional need be said. As the albumose is due to the digestive action of invading microbes on the albumins of the fluids and tissues of the body, its presence in the urine simply indicates that we have to do with an infective condition in a state of more or less activity. A word or two, however, in regard to the question of so-called peptonuria and the presence of suppuration within the body.

The digestive or peptonizing power of the ordinary pus-microbes is usually quite active, and whenever suppuration is taking place anywhere within the body albumose is always present in the urine.

This albumosuria, however, can only be held indicative of suppuration when all other infective conditions can be excluded. The question may be stated thus: Given a patient with a probable circumscribed inflammatory condition, in which the infective diseases can be excluded, the presence of albumose in the urine is quite positive evidence that the condition is inflammatory and that suppuration has taken place.

I have by this means correctly diagnosticated suppuration many times, in conditions which were otherwise very doubtful and uncertain.

In closing, I desire to present the following conclusions as a result of this study:

1. True peptone being very rarely, if ever, found in the urine, the term peptonuria should be substituted by the term albumosuria.

2. The albumoses are produced by the digestive or peptonizing action of microbes on the albumins of the body.

3. This digestive action is one common to all forms of living organisms.

4. The albumoses are produced in quantities much in excess of what are appropriated by the microbes for their growth and development.

5. The albumoses being readily diffusible, the excess in production is

quickly absorbed by the blood, where, being toxic, and thus acting as foreign bodies, they are eliminated by the kidneys and appear in the urine.

6. Albumosuria may be present in any condition or disease due to the action of micro-organisms within the body, and is thus simply indicative of an infective condition.

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REVIEWS.

PÆDIATRICS. THE HYGIENIC AND MEDICAL TREATMENT OF CHILDREN. By THOMAS MORGAN ROTCH, M.D., Professor of the Diseases of Children, Harvard University. Illustrated. Pp. 1124. Philadelphia: J. B. Lippincott Co., 1896.

AT the end of the nineteenth century an author who presents to a literature-burdened profession a book of more than 1110 pages assumes a responsibility of considerable magnitude. If he be honest, he must convince himself that he has something to impart and that there exists a real need for something that he can supply. An opportunity is given to him in his preface to explain his convictions, and Dr. Rotch embraces this opportunity by saying:

"There has been no attempt to make such classifications as infectious and non-infectious diseases, because our knowledge of the former is increasing the number of that class so rapidly that for me it no longer constitutes a practical division for teaching. The book begins with a consideration of the infant at birth, and follows it through its various stages of development up to puberty. After dwelling rather more at length on normal development than is usual in works on pædiatrics, the abnormal conditions are discussed. Beginning with the diseases which would naturally be met with in the early periods of life, and devoting considerable space to my observations on the blood of infants and of young children, the diseases of the different organs are then considered.

"The establishment of milk-laboratories during the last three years has marked a new era in preventive medicine, and has made possible the scientific feeding of infants. As I believe that the medical treatment of the various abnormal conditions arising in infants is in the future to be largely dietetic rather than by means of drugs, I have given unusual prominence to the part of the work which is devoted to feeding.

"I have also endeavored, in conjunction with my colleagues in the American Pædiatric Society, to simplify the nomenclature of the various diseases, in order that physicians in different localities should by using identical names be the better able to aid one another in their investigations. A revision of the nomenclature of gastro-enteric diseases and of those of the mouth was especially called for on account of the changes which have followed our increasing knowledge of the etiology of these diseases."

Division I., on the Infant at Term; Division II., on Normal Development; and Division III., on the Hygiene of the Nursery, are excellent. Attention is especially called to the beautiful casts of the fœtal heart and bloodvessels, and of the nasal cavity, made in fusible metal by Dr. S. J. Mixter; and also to the plate showing the color of napkins caused by normal and abnormal intestinal discharges.

Division IV. is devoted to feeding—the general principles underlying all methods of infant-feeding, maternal feeding, direct substitute-feeding, indirect substitute-feeding, comparison of woman's and cow's milk, milk-laboratories, and the home modification of milk. It covers 135 pages, and is not only the most important part of the book, but is without doubt the most valuable contribution to the subject of infant-feeding that has as yet appeared.

The lectures on the blood in infancy and childhood cover 75 pages, and represent many original and valuable observations. However, we think that the proper place for it should be in a separate monograph and not in a text-book for students. The space devoted to this subject is out of proportion to its value, and could be used to greater advantage.

Division XI., consisting of 175 pages, is devoted to nervous diseases. This is an inadequate allotment when one considers the number of nervous diseases that are discussed, and that the chapter includes the subject of convulsions and the myopathies. In the introduction to this part of the work the author remarks that "We are much more likely to meet with nervous phenomena of the most diverse varieties in children than in adults. . . . The nervous specialist who has not worked practically among children, studying them in all their various phases of excitement and rest, disease and health, may fail to grasp the special phase of nervous disease by which he is at times confronted."

We do not doubt that his classification of nervous diseases may serve to facilitate understanding of them by students, but we fail to comprehend why hypnotism, insolation, and arrested psychical development should be included under the functional diseases of probable central origin. The first is not a disease, but a condition which may be artificially produced; the pathology of the second has been written; while for the third it is not reasonable to contend that it exists without somatic foundation.

Meningitis is considered in some detail, and, notwithstanding published cases to the contrary, the author is not willing to concede that any cases of the tuberculous variety recover. He recommends that palliative measures alone be used in this disease, in spite of the fact that, among others, Dujardin-Beaumetz reported a case of tuberculous meningitis ending in recovery, and the diagnosis was confirmed by the presence of tubercles of the choroid; and Freyhau reports another case of recovery in which the diagnosis was confirmed by the presence of tubercle-bacilli in the fluid obtained by lumbar puncture. We believe that the operation of lumbar puncture as described by Quincke, of Kiel, both for diagnostic purposes in this disease and for diagnostic and therapeutic purposes in hydrocephalus, is an omission of importance.

The subject of cerebral abscess really merits more extensive consideration than can be given to it in something more than half a page; and encephalitis, especially the acute non-purulent form, which often goes to recovery and is mistaken for meningitis, has not received the consideration which the author is so capable of giving it.

We must express our disappointment on reading the pages devoted to the subject of idiocy. At the present day when the pathology of idiocy has been so thoroughly presented as it has been by Hammarberg, and after sufficient time has elapsed to judge the statistics of Lannelongue's operation, no mention whatsoever is made of these important facts.

The subject of mirror-writing is allowed nearly twice the space of

intracranial syphilis, and three times that given to cerebral abscess. The statement is made that "the actual pathology has not been determined," while we all know that the pathology has been as thoroughly written as it possibly can be, and that it may occur in perfectly normal children.

The course of acute anterior poliomyelitis is not chronic, although its sequelæ are; and we should expect some reference to the epidemic form of this disease after the important contributions of Medin and Caverly. Complete helplessness with mental impairment cannot be said to be characteristic of Friedreich's disease, when the first case presenting any mental impairment is yet to be put on record. The space devoted to Sensitive Spine might well be given to a discussion of chorea nutans (head-nodding), and this condition, if it exists, be perpetuated under its proper name—neurasthenia. In discussing tetany no mention is made of two symptoms which are considered almost pathognomonic, viz., Chevostek's and Trousseau's."

The chapter on Diphtheria is excellent as far as it goes, but twelve pages seem very little to devote to such an important subject, and the one page given to the discussion of the serum-treatment would be of no assistance to a student or a physician who needed much help.

The book is filled with instructive illustrations, and the press-work is excellent; and it seems unfortunate that the style should be so difficult and involved, and that such little care should have been given to the relative value of the subjects under discussion.

On the whole, the book contains many valuable monographs which will be of great value to the general practitioner and to the pædiatrist; but as a text-book for students we think that it is unsatisfactory.

D. B.

LEHRBUCH DER ALLGEMEINEN PATHOLOGIE UND DER PATHOLOGISCHEN ANATOMIE FÜR AERZTE UND STUDIRENDE. Von DR. ERNST ZIEGLER, Professor der Pathologischen Anatomie und der Allgemeinen Pathologie und der Universität Freiburg in Breisgau.

TEXT-BOOK OF GENERAL PATHOLOGY AND PATHOLOGICAL ANATOMY FOR PHYSICIANS AND STUDENTS. By DR. ERNST ZIEGLER, Professor of Pathological Anatomy and General Pathology in the University of Freiburg in Breisgau. Eighth, newly revised, edition; 2 vols., 8vo., pp. xii. 746; xii. 1025. Jena: Gustav Fisher, 1895.

THERE is probably no more striking evidence of the rapid and continuous progress which is making in our knowledge of disease than is to be gleaned from a comparison of the successive editions of Ziegler's great work on *Pathology*, to the eighth edition of which it is now our agreeable duty to call the attention of the readers of the JOURNAL. Although not quite three years have elapsed since the appearance of the preceding edition, the book has undergone many and notable changes, which have brought about a very material increase in its size and in the number of its illustrations.

By far the most fundamental of these changes is foreshadowed in the altered title of the first volume, which from "General Pathological Anatomy and Pathogenesis" has now come to be "General Pathology,"

a far more inclusive term, and one implying a much broader discussion of the changes in the body resulting from and constituting disease than was possible when only the structural elements of disease were considered.

The magnitude of the task thus undertaken is apparent at the outset from Ziegler's conception of disease in general, which is defined as "life, whose manifestations depart in a measure from the norm" of health, for it will be observed that this wider conception of pathology involves a consideration not only of the changes in structure of the tissues and organs incident to disease, but of the perversions of function also which make up in a great degree its outward manifestation. We accordingly find in the present edition a very thorough revision of the opening chapters which deal with the underlying principles of disease, with its causation and chief general symptoms. But, though thus emphasizing the importance of a consideration of the disturbances of the function met with in disease, Ziegler would discard the idea of the existence of purely functional diseases, believing that material changes of some sort, physical or chemical, will sooner or later be found to underlie all perversions of function just as they are at the foundation of all the normal processes of life.

Aside from this broader treatment of the subject-matter of the first volume, the most considerable changes in this part of the work are met with in the chapters on the Causation of Disease, on Inflammation, and on the Parasites, including, of course, the bacteria.

The first of these, the section on the Causation of Disease, has been for the most part entirely rewritten and much elaborated. This is particularly apparent in the discussions of the effects of intoxications and infections, of metastasis, embolism, and thrombosis, and of the influence of disease of one organ upon the other organs of the body. In connection with the last of these an entirely new section has been introduced, treating of the diseases which recent investigations would show to be in great part, if not wholly, the result of the removal from the body of the functional product of some particular organ. These are cachexia thyreopriva, cretinism, myxœdema, Addison's disease, and some of the forms of diabetes mellitus.

Again, a much more extended treatment is observed in the chapters on Natural Immunity and Recovery from Disease; on Predisposition, both Inherited and Acquired; on Idiosyncrasy; and on the Induction of Immunity by Artificial Means, these subjects being considered not only in their relations to the origin and course of the disease, but also from the standpoint of their practical applications to medicine.

The section upon Inflammation has been entirely rewritten to bring it into conformity with the conception of the inflammatory process suggested by Ziegler about two years since, that it "is essentially a local tissue-degeneration combined with pathological exudations from the bloodvessels, with which tissue-growth is sooner or later associated as a regenerative or hypertrophic process." This conception brings together all the changes, whether destructive or constructive, which result from the action of any injurious agent, and makes more logically apparent than heretofore the close inter-relationship of the various phenomena of inflammation. To us the most noteworthy of the advantages derived from this change is the elimination of the anomalous class of "Granulationsgeschwülste," and the incorporation of tuberculosis, syphilis, rhino-

scleroma, etc., as special forms of inflammation, with the sections devoted to the consideration of the specific germs which are their cause. It has long been our contention that the separation of these processes in a group by themselves and their consideration as of an essentially different character from the inflammatory process were confusing and based upon an erroneous conception of their nature. Fundamentally their elements are the same as those of the simpler varieties of inflammatory reaction —degeneration, exudation, and tissue-hyperplasia—the particular combination of these elements in each case depending upon the peculiarities of its active etiological factor.

Additions are also noticeable in the chapters on Degeneration and Regeneration, on the Tumors, on the Malformations, and on the Parasites, the additions of the past few years to our knowledge of these subjects being everywhere incorporated. Indeed, it would be possible to notice briefly the present edition of Ziegler's work by the simple statement that it has undergone all the changes necessary to bring it consistently in line with the most recent advances in our knowledge of disease. A higher commendation is hardly possible.

In the second volume, devoted to the changes in the various organs incident to disease, to Special Pathological Anatomy, the same careful revision of all the chapters is observable, though here the changes made necessary by our advancing knowledge are less conspicuous.

The clear typography and abundance of excellent illustrations characteristic of the previous editions are preserved in the present, and the copious bibliographical lists scattered throughout the volumes include all the most important articles upon the various subjects treated of which have appeared up to the time of going to press, thus materially increasing the usefulness of the book as a work of reference. J. S. E.

SURGERY: A PRACTICAL TREATISE WITH SPECIAL REFERENCE TO TREATMENT. By C. W. MANSELL MOULLIN, M.A., M.D. Oxon., Fellow of the Royal College of Surgeons, etc. Assisted by various writers on special subjects. Third American edition, revised and edited by JOHN B. HAMILTON, M.D., LL D., Professor of the Principles of Surgery and Clinical Surgery, Rush Medical College. Philadelphia: P. Blakiston, Son & Co., 1895.

THE first American edition of this book was a reprint of the English edition. The second was revised and edited by Dr. Hamilton, the editor of the present edition. He omitted certain portions of Mr. Moullin's chapters on Diseases of the Skin, Eye, Ear, and Larynx, added a brief chapter on Military Surgery, and inserted various short notices in different parts of the volume. The third American edition does not differ very much from the second. Both are founded on the American reprint of the English edition of 1891.

Moullin's *Surgery* contains a very great deal of valuable information; and is often referred to by the reviewer, because of its encyclopædic character. It has always, however, been aggravating because of its want of clearness in diction and its faulty style. The reader who is familiar with surgery can usually understand the author; but the student

or inexperienced practitioner, who refers to it, will often be greatly disappointed because of his inabilty to know exactly what are the facts which the author desires to teach him.

This criticism applies particularly to the sections on Surgical Pathology. These contain the essential facts of bacteriology and microscopy, known at the time the book was written, which are requisite for the understanding of surgical diseases and injuries. The text, however, is so involved and so obscure that it tempts one to believe that the author himself did not clearly understand the subject he was discussing.

Much of this obscurity is due to carelessness in the use of words and the repeated introduction of long parenthetical clauses. A Fellow of one of the colleges of Oxford University ought to be able to write clearer English, particularly when he is discussing scientific subjects.

The American editor seems to have realized these defects in Mr. Moullin's style, for he occasionally introduces in brackets short summaries of the preceding pages, as if he felt it necessary to attempt to bring some sort of order out of the chaos of involved statements. Such notes of the editor will be found on pages 31, 35, and 45.

An instance of the author's ill-use of the English tongue is the following extract:

"Unfortunately cleansing a wound with an antiseptic causes other effects as well. All antiseptics injure the tissues they touch to a greater or less extent, and increase the amount of fluid poured out (carbolic acid is probably the worst in this respect, iodoform the best); and many of them are used with water, which, unless it is thoroughly sponged out (again an irritant, of some importance, too, especially in connection with the peritoneum), adds still more to the quantity." Page 168.

An example of this lack of clearness in statement is this quotation taken from the beginning of the chapter on "Diseases due to Non-infective Organisms:"

"Of these there are only two—septic fever and sapræmia. These diseases are caused by the absorption from the surface of a wound of certain poisons produced during the fermentation or decomposition of albuminous liquids. Probably they are ptomaïnes, analogous to the bodies formed in the alimentary canal. If they enter the blood, they act as virulent poisons, the severity of the symptoms depending upon the amount of the dose; and they may cause a fatal result within a few hours. On the other hand, they do not multiply in the blood, which therefore is not infective if it is inoculated; they are excreted slowly by the kidneys (ptomaïnes, probably formed in the alimentary canal, are found in the urine and saliva), and if the patient survives the first effect and the dose is not repeated, the constitutional symptoms gradually subside. There is no incubation-period, and, other things being equal, a large wound, or one that exposes a large absorbent surface, such as the peritoneum, is much more likely to be attended with a severe attack than a small one."

On page 97 it is said that chancroid or soft chancre is seldom followed by constitutional symptoms; while on page 99 the author makes the positive statement that "No constitutional symptoms ever follow a true soft sore." In the discussion of spina bifida we are told that "the only treatment that has met with success is the injection of Morton's fluid;" and yet in the next paragraph we are informed that excision of the sac has been practised successfully in certain forms of the lesion.

The statement is made that ether for general anæsthesia is always given through an inhaler, and that "drunkards can scarcely be got under its influence, unless they are partially intoxicated already." It would be difficult to convince the readers of THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES of the truth of these assertions.

It may seem to some unnecessary to call attention to these defects in Mr. Moullin's book, which really contains so much valuable information on surgical subjects. The reviewer would not do so if the faults of this kind were few, but the fact that the volume teems with such defects makes it necessary to mention the circumstance and prove the assertion by quotations.

Moullin's *Surgery* is a valuable work of reference for the experienced surgeon. It must be confusing and unsatisfactory as a text-book for college use, since students have not the knowledge to understand its lines or to determine the value of its contradictory statements.

Dr. Hamilton has made a valuable addition by the chapter on Military Surgery, which is full of suggestions useful in civil practice.

The omission in this edition of the full-page colored frontispiece, found in the first and second editions, is an evidence of appreciation of the artistic dignity that should pertain to scientific publications.

J. B. R.

DIAGNOSTIK DER KRANKHEITEN DER BAUCHORGANE. Von Dr. med. et phil. HANS LEO, a. o. Professor und Leiter der medicinischen Poliklinik an der Universität zu Bonn. Zweite vermehrte Auflage. Mit 45 Abbildungen. Berlin, 1895.

DIAGNOSIS OF DISEASES OF THE ABDOMINAL ORGANS. By HANS LEO.

THE first edition of Leo's *Diagnosis* dealt solely with diseases of the organs of digestion. In the second edition the scope of the work has been enlarged so as to include the diseases of the urinary organs. Diseases of the spleen are also considered. He has wisely, therefore, altered the title of the book to *Diagnosis of Diseases of the Abdominal Organs.* The name is still a trifle misleading, however, as the diseases of the sexual organs are not taken up, a scanty paragraph only is allotted to diseases of the suprarenal bodies, and the diseases of the ureters are omitted. The intimate connection between the stomach and the œsophagus is Leo's warrant for describing the affections of the latter.

The work is divided into two parts, the first being the Examination of the Organs and the Clinical Characteristics of the Various Diseases, the second the Examination of the Secretions and Excretions of the Abdominal Organs (including the fluids of the mouth). This arrangement makes the work much handier as a reference-book, as the technique of chemical, microscopical, and bacteriological aids to diagnosis is considered apart from clinical signs, in a chapter by itself.

In the first part the diseases of separate organs are systematically taken up, a general consideration of the subjective symptoms and the physical examination preceding in each instance the discussion of the particular diseases.

The work necessarily partakes of the character of a compilation. Rare good judgment is shown in the condensation of material, in its systematic arrangement, and in the proper subordinaton of matter secondary, to

that of primary, importance. In referring to the work as a compilation we do not wish to be understood as detracting from its merit or as underestimating the importance of the author's labor. The proper editing of scientific literary material demands unusual power of discrimination. Leo has shown his ability as an editor. The work gives evidence of a wide range of reading, of broad clinical experience, and of original work.

Diseases of the stomach are fully discussed. The chapter devoted to this subject, on which Leo has done so much work, shows the author at his best.

In speaking of the various tests for free hydrochloric acid he regards the phloroglucin-vanillin, or the resorcin-test (Boas), as the best and most reliable for general work. A negative result with these tests does not, however, prove that no hydrochloric acid is present. In case the test is negative, one must test still further with Leo's test ($CaCO_3$). This test he regards as the only one whose negative result proves positively the absence of hydrochloric acid (p. 304). The constant absence of the free acid he regards as pointing suspiciously, but by no means positively, to carcinoma. He is likewise skeptical as to the clinical value of Boas's test for lactic acid, not regarding its positive result as necessarily indicative of carcinoma. It is also, he thinks, so much more complicated than Uffelmann's as to be really impractical.

The physical examination of the liver is exceptionally well described. We should be glad, however, to see some one frankly admit the great difficulty there is, in many cases, of palpating the surface of the liver to determine its smoothness or roughness. Not infrequently it is impossible to speak positively concerning the liver-surface unless conditions are peculiarly favorable. And yet many text-books would lead one to think that this can be as easily determined as the location of the apex-beat of the heart.

We are pleased to note that Leo asserts that many normal kidneys can be felt to move with respiration (p. 225). Also that because we can feel a kidney we are not to regard it as pathological or as dislocated (p. 224). Also that percussion, except in the case of enlarged kidneys, is of doubtful value as an aid in determining the location of the kidney. He takes, too, the middle ground as to the frequency of occurrence of movable kidney, believing that Litten with his figure at 75 per cent. (women) is too high, and Senator with 1 per cent. is too low.

The differential diagnosis between an enlarged or movable kidney and a pathological gall-bladder is not referred to, though the two conditions are at times readily confused.

One or two other omissions may be mentioned in this connection. No reference is made to hemorrhagic pancreatitis; nor is the intermittent fever attending occlusion of the gall-duct. Addison's disease, as has been said, is hurriedly dismissed. The practical ureometer of Doremus is not described.

In the chapter on the Examination of the Feces the methods of detecting cholera and typhoid bacilli are exceptionally full and merit special praise.

No one can read the book without receiving practical aid in the art of diagnosis. Yet somehow it seems to lack that quality of friendliness found in Leube, that makes Leube's work so valuable to the practitioner, that quality that makes you feel as though the author were letting you into

a secret, and were confidentially whispering to you a little point that he had learned by experience to be of value and in which he is willing you should be a sharer. While this makes Leube's work, in our opinion, of greater value to the experienced diagnostician who seeks the refinements and details of diagnosis, the student and practitioner will find Leo's *Diagnostik* thoroughly reliable, up-to-date, and containing in small space all the essentials of diagnosis of diseases of the abdominal organs.

J. B. H.

CLINICAL ILLUSTRATIONS OF THE DISEASES OF THE FALLOPIAN TUBES AND OF TUBAL GESTATION. A Series of Drawings, with Descriptive Text and Histories of the Cases. By CHARLES J. CULLINGWORTH, M.D., Hon. D.C.L. (Durham), F.R.C.P. London: Rivington, Percival & Co.

THIS book contains the best macroscopical illustrations of the various pathological conditions which affect the Fallopian tubes which we have yet seen. The admirable drawings are from specimens which were removed in the course of the author's operative work.

All of the gross forms of tubal disease are represented, pyosalpinx, tubercular and gonorrhœal; hydrosalpinx, hæmatosalpinx, and tubal pregnancy. The author applies the term hæmatosalpinx to hemorrhage into the Fallopian tube caused by tubal pregnancy, and apparently does not reserve this term for those unusual cases of hemorrhage into the tubes unconnected with pregnancy.

Each illustration is a good type of the class which it represents. The illustrations are accompanied by short clinical histories of the origin and course of the disease. The cases of pyosalpinx were chiefly of gonorrhœal origin.

Two of the illustrations represent very rare conditions: one an indisputable case of complete tubal abortion in which the embryo was between the third and fourth week of development, and the other primary carcinoma of the Fallopian tube.

The author states, on the authority of Mr. Doran, that only seven instances of primary carcinoma of the Fallopian tube had previously been reported in a satisfactory manner. The frontispiece is a very good drawing of the uterus, Fallopian tubes, ovaries, and broad ligaments as seen from behind in the healthy adult. Such a preface is very appropriate in a series of drawings of diseased Fallopian tubes.

The value of this book depends upon the illustrations, which render it especially useful to any one engaged in teaching gynecology.

C. B. P.

PROGRESS
OF
MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Therapeutic Uses of Mescal Buttons.

Drs D. W. Prentiss and Francis P. Morgan suggest the therapeutic uses of mescal as follows: As an antispasmodic in abdominal pain, irritable cough, nervous headache, hysteria, spasmodic asthma, convulsions, and as a substitute for opium and chloral in delirium, great nervous irritability and restlessness, and in insomnia due to pain. As a cerebral stimulant in melancholia, hypochondriases, and in some cases of neurasthenia. The drug may be used in color-blindness, because it possesses a remarkable power of producing visions of color. The following preparations may be used: *tinctura anhalonii* (10 per cent.), dose one to two teaspoonfuls; *extractum anhalonii fluidum* (100 per cent.), dose 10 to 15 drops; *pulvis anhalonii*, dose 7 to 15 grains. The taste of the liquid preparations is somewhat disagreeable, unless it be disguised by some suitable vehicle, as fluid extract of liquorice or elixir of yerba santa. The powder is best administered in wafer paper, cachets, or capsules.—*Therapeutic Gazette*, 1896, No. 1, p. 4.

[For the preliminary paper see The American Journal of the Medical Sciences, 1895, vol. cx., No. 6, p. 699.—R. W. W.]

The Action of Anemonin.

Dott. G. Nola concludes from his experiments that (1) this drug is a poison of slow action whatever may be the dose. (2) The phenomena embrace three distinct periods: hypnotic, paralytic, and convulsant. (3) The paralytic period can be marked by two phases: in the first the sensibility and the reflexes are preserved; in the second one or both are abolished or markedly depressed. (4) This picture is constant for large or medium doses; with small doses there may be only a hypnotic action with return after some time to a physiological condition. (5) The first two effects (sleep, paralysis) are constant, although in different degree, in all animals and in

every dose; convulsions may be wanting, but only occasionally. (6) They vary in intensity and form from simple isolated spasm to true tonic-clonic convulsions. (7) The sleep, as from other hypnotics, is probably due to the physiologico-chemical action of the drug upon the cerebral cortex. (8) The paralysis is of central origin, with the participation at first of the medulla, and later of the spinal cord. (9) The convulsions are of bulbar origin. (10) The respiratory and circulatory functions are not at first influenced; but later they are depressed, as are all the other organic functions. (11) Death occurs with complete muscular resolution through arrest of respiratory mechanism.—*La Medicina Contemporanea*, 1896, No. 1, p. 55.

The Treatment of Chorea.

Dott. E. De Renzi has made use of eserine, antipyrine, salol, and ether-spray along the vertebral column, but he has confidence in only three remedies: (1) Absolute rest, avoiding any external excitation whatever, and placing the patient in a dark room. (2) The ascending electric current along the spinal cord—the best results with a gentle current, progressively increased. (3) Arsenic in large doses, commencing with twenty drops of Fowler's solution each day for children, and double this amount for adults. When the chorea ceases the medicine should be continued, for the disease returns readily. The nutrition of the patient must be maintained, and good food and gymnastics are useful.—*Gazetta degli Ospedale et delle Cliniche*, 1896, No. 29, p. 306.

The Association of Certain Antithermics and Analgesics in Internal Therapeutics and Ophthalmology.

Drs. E. Berger and E. Vogt recommend the following formula: antipyrine, 5; phenacetine, 2; acetanilide, 1. Of this the dose is seven and one-half grains. In pulmonary tuberculosis the hectic fever has been controlled without inconvenience for weeks and months by three doses each day. In facial neuralgia and typical migraine fifteen grains given at half to two-hour intervals have yielded good results. In the gastric crises of tabes, various rheumatic affections, lumbago, torticollis, the results have been satisfactory. Among ocular disease we find various indications for its use: corneal ulcers, irido-cyclitis, chronic iritis, keratitis. In rheumatic iritis it is inferior to sodium salicylate.—*Revue de Thérapeutique*, 1896, No. 4, p. 104.

Theobromine in Diseases of the Heart and Kidneys.

Dr. H. Huchard notes that the diuretin of commerce is not a chemical combination, but a mixture which should be banished from therapeutics. It is prepared by dissolving 18 per cent. of theobromine in a 4 per cent. solution of caustic soda, to which 16 per cent. of sodium salicylate is added. Sée has pointed out the harmful effects of the caustic soda, and further to obtain diuretic results it is necessary to double or even treble the usual dose. Geissler, after eight days' use of this drug, noted tachycardia, aryhthmia, and even cyanosis—none of these occurred with pure theobromine. We cannot accept the statement that theobromine is caffeine deprived of its excitant

properties, because when we exceed the dose of thirty to forty-five grains, and especially seventy-five grains, we note a headache, which is more or less severe, although there are individual idiosyncrasies. This headache is peculiar in that it is not pulsatile as is that of glonoin, nor buzzing and vertiginous as is that of quinine, but commences in one of the temples and extends gradually to the other side, even reaching to the occipital region, where it remains fixed as a constrictive pain. This occurs in about 10 per cent. of the cases, and is likely to be so unbearable that in spite of the good results of the drug it must be abandoned or given in small doses. Twice only has cerebral excitement been noted, but not to the extent of delirium. More rare are digestive disturbances, especially after large doses, as nausea and vomiting. The drug acts directly and electively upon the renal epithelium, and in only a single instance did it give rise to albuminuria from a kidney previously healthy; but in three instances of patients suffering from albuminuria and cardiac disease which had reached the point of asystole, with peripheral œdema and visceral congestion at the time when from diuresis there was an absorption of the œdema, the albumin has notably increased. The drug not does not increase the blood-pressure nor act directly upon the heart, although in several instances the cardiac impulse became stronger and the pulse slightly less frequent. The diuresis commences with the first day of its administration, and continues several days after the withdrawal of the drug. On the second or third day it may be four or five quarts. Practically it holds a middle place between that of digitalis, slow to appear and slow to disappear, and that of caffeine, which is less abundant, less sure, and less persistent. The mode of administration is: the first day, six capsules of 8 grains; the second, eight; the third, ten; and this dose to be continued for three or four days more. At times it may be necessary to continue it for a longer time; this can be safely done, for it is but slightly toxic.—*Nouveaux Remèdes*, 1896, No. 2, p. 32; *Revue de Thérapeutique*, 1896, No. 3, p. 69; and *Bulletin Général de Thérapeutique*, 1896, 3e liv., p. 45.

M. BARDET objects to the theory that this drug acts especially upon the renal epithelium, believing that the diuretics capable of acting upon the epithelium exercise a dangerous alterant action. No drug is capable of acting upon ascites, in preventing the extravasation of liquid contained in the vessels, unless it possesses at the same time the property of increasing arterial tension and of diminishing the tendency to capillary stasis. Therefore, the explanation of its value as a diuretic rests to a great extent upon its vasomotor activity, but it is placed second to caffeine, as brucine takes rank after strychnine.—*Bulletin Général de Thérapeutique*, 1896, 3e liv., p. 84.

THE TREATMENT OF ENURESIS.

MR. E. N. NASON reports that a woman of twenty years had suffered from the earliest childhood, scarcely ever missing a night, and on some occasions wetting the bed two or three times in a single night. After the usual medication had failed a solid No. 10 catheter was passed into the bladder and connected by a tube with an irrigating basin, containing a measured quantity of boric acid solution. The basin was raised from one to two feet and the bladder injected, until the patient complained of slight pain, when it

was lowered. The positive electrode of a constant-current battery was applied over the lumbar spine and the negative placed in the fluid in the basin, thus completing the circuit through the liquid in the basin, tube, and bladder. A weak current was than allowed to pass for some ten minutes. This was repeated every evening for a fortnight, then at longer intervals. By this method a current of electricity would, after passing from the neighborhood of the lumbar cord through the vesical nerves, be evenly distributed over the walls of the distended bladder. The toleration of the bladder was rapidly increased from four ounces on the first occasion to twenty ounces at the end of a fortnight. After some months of treatment the urine could be retained for a much longer period, and the patient has been practically well for nearly four months.—*British Medical Journal*, 1896, No. 1832, p. 336.

Hæmato-catharsis.

Dr Pierre Delbet ascribes the method of blood-lavage to Dastre, who in 1888-89 showed what use could be made of it in infectious diseases. With animals inoculated with cultures of pathogenic microbes or with toxins of microbic origin washing the blood only hastened the evolution of accidents and the fatal termination. Three observations were reported. The method consists of the repeated intravenous injection of artificial serum (1 to 2 quarts). Three striking phenomena are observed: a chill, a sensation of comfort, and a lowering of the temperature. The injection is intended to fill the vascular system to repletion, when elimination by the kidneys will follow. The useful effect of the injections appears to be directly proportioned to the quantity of fluid eliminated by the kidneys. The increase of blood-hydration apparently prevents absorption if we may so conclude from an experiment with strychnine which is here reported. If the blood-mass is much diminished, absorption will take place rapidly from cellular tissue up to the time when the former reached its highest point; after this absorption is insignificant.—*La Presse Médicale*, 1896, No. 16, p. 93.

Charcoal.

Dr. Robert B. Wild has made a careful laboratory study of this drug and finds that externally it is a very dirty application if used in sufficient quantity, and for ordinary cases the present antiseptic drugs are more cleanly and more effectual, and are not likely to be superseded by charcoal. Internally it has been used when there is undue decomposition of the contents of the alimentary canal, such as occurs with dilatation of the stomach, certain forms of gastric or intestinal indigestion, and other conditions when the alimentary canal contains abnormal toxic substances, and in certain specific diseases presenting local lesions of the alimentary canal. Many of these, as cholera, typhoid fever, dysentery, and certain forms of diarrhœa, are due to living organisms, and of recent years the view is more and more gaining ground that many of the symptoms in these cases are due not so much to the living organisms as to the formation of various toxic substances (*e. g.*, the typho-toxin of Brieger and Fraenkel), which exert an injurious action upon the alimentary canal, or by their absorption from it produce a more

general intoxication. Charcoal appears to be worthy of further trial, although devoid of antiseptic properties, from its action by oxidizing the chemical substances formed during abnormal decomposition or the various toxins produced by pathogenic organisms. This action may be direct or indirect through the aërobic process of putrefaction, and it is possible that a supply of oxygen contained in the charcoal may modify the metabolic processes of the pathogenic organisms themselves, and render them or their products less virulent. The power of this drug to remove alkaloids from solution is worth considering, as certain toxins and ptomaïnes are possibly of this nature. Thus it may prevent auto-intoxication from the alimentary canal, and, as has been suggested, also act as a laxative or remove mucus from the walls of the alimentary canal. It may be administered in from two to six teaspoonfuls—and increased—daily. Charcoal obtained from some kinds of wood absorbs a larger volume of gas than that obtained from others. Belloc claimed that poplar charcoal was superior, but the Commission of the French Academy found only that it was of extreme porosity.—*The Medical Chronicle*, 1896, No. 6, p. 401.

Stypticin.

Dr. H. Gaertig has made use of this remedy during the past two years in the form of powder administered in wafers, in solution (ten drops representing about one grain), and finally in gelatin pearls; the last method is preferable. The dose is about one grain twice to eight times daily. The use of six doses each day for many weeks gave rise to no inconvenience. Forty-six instances of its use are briefly presented. Among these may be cited: seven of menorrhagia; endometritis with hemorrhage, eleven; complicated and simple retroflexion, eleven; uterine subinvolution, *post partum* or *post abortum*, seven; climacteric hemorrhage, three; hemorrhage following inflammation of the appendages, with retroflexion, once, without retroflexion twice; hemorrhage from myoma, four; and hemorrhage after threatened abortion once. The most positive results were obtained in uncomplicated menorrhagia and in that of the menopause. The drug is apparently valuable for the hemorrhage of subinvolution and for that associated with inflammatory conditions of the appendages.—*Therapeutische Monatshefte*, 1896, Heft 2, S. 70.

[See also The American Journal of the Medical Sciences, 1896, vol. cxi., No. 3, p. 339, for composition and manufacture of this drug.—R. W. W.]

Bone-marrow in Anæmia.

Dr. Caroline S. Pease reports seven cases of simple anæmia. The preparation was made by macerating for four days the finely broken cancellated bone of sheep's ribs containing the red marrow in pure glycerin at 70° F., and straining the resultant fluid through flannel. Weekly examinations were made as to hæmoglobin, red corpuscles, leucocytes, and weight of patients. The initial dose was intended to be a dessertspoonful thrice daily; by accident double this quantity was given, resulting in diarrhœa. The former quantity even being laxative, probably on account of the glycerin, the dose was reduced to one teaspoonful. During the five weeks under observation

the percentage of hæmoglobin was increased from an average of .47+ to an average of .87+; the number of red corpuscles was increased from an average of 4,084,000 to an average of 4,731,000; and the number of leucocytes was decreased from an average of 15,000+ to an average of 6000. The changes in weight during treatment were practically none, there having been a gain of only one and a half pounds in the aggregate weight of the seven patients. With reference to the rather low percentage of hæmoglobin, it may be said that with the Gowers hæmoglobinometer (which was used in these cases) Stockton states that the normal percentage in women is only from 82 to 88, and Henry and Stengel believe that it is unusual to reach 95 to 100 on this instrument. [With a recently manufactured instrument Stockton's observation is probably correct. The liquid in the colored standard tube, however, fades so that the percentage later becomes correct, as shown. R. W. W.]—*New York State's Hospital Bulletin*, 1896, No. 1, p. 133.

Bone-marrow in Diphtheria.

Dott. A. Trambusti, noting the importance of the leucocytes as organs of protection against an infective disease, acting not only as phagocytes, but as well through their elaboration of a chemical substance which is capable of conferring microbicidal powers upon the blood-serum, has studied the structural modifications of these elements in the course of an infection, and also under the action of a toxic substance of bacterial origin. These modifications have been observed in the experimental diphtheria of healthy rabbits, either from inoculation with active cultures of the bacilli of diphtheria, or from subcutaneous injection of varying quantities of the toxin of diphtheria. Observations have been made upon the bone-marrow at different periods of the infection, and after more or less grave intoxication. The results are as follows: Bone-marrow reacts in the course of an infective diphtheritic process with great functional activity of the cellular elements of which it is composed. This energetic functional activity of the cellular elements tends more toward the function of secretion than to that of reproduction. This increased function of secretion shows itself microscopically both by a greater quantity of granulations in the interior of the cell-plasma, and by a greater quantity of free granulations. This great functional activity of the cellular elements is diminished, with the progress of the infection, by the accumulation of a greater quantity of toxic material within the organism. Although this material in small dose stimulates the above-mentioned energy, yet it here acts as a paralyzant and in producing necrosis. The results which he has obtained from the use of bone-marrow justify his belief that the leucocytes produce a substance which is bactericidal and antitoxic.—*La Settimana Medica*, 1896, No. 4, p. 55.

Antitoxin in Diphtheria.

Dr. John Winters Brannan, from his observations in the Willard Parker Hospital, states that the reduction in mortality began with the introduction of the serum-treatment and became more and more marked as the year progressed. These improved results are probably due to the greater strength of the serum employed, as well as to the more efficient dosage

during the later months, the natural consequence of longer experience in its administration. From a study of the tables of cases of "deaths according to day of disease upon which treatment was begun," he concludes that this, though far from supporting the claim that antitoxin is a specific in diphtheria, apparently proves conclusively that the new treatment, when applied early in the disease, gives much better results than the older methods. Among the causes of death we note a much greater mortality from bronchopneumonia under antitoxin, while that from laryngeal stenosis and sepsis has markedly diminished. The mortality among patients upon whom tracheotomy or intubation has been performed has also diminished—from 85 to 68 per cent. The death-rate among patients between the ages of two and twelve years shows a lowering, while the showing of antitoxin when administered to patients over sixteen years is unfavorable. The tables cited demonstrate fairly that diphtheria-antitoxin has considerable therapeutic value, even in hospital-practice, an admittedly poor field for a demonstration of its curative action. The remedy often had a favorable effect upon the laryngeal symptoms, especially of the intubated cases; but no effect is noted, favorable or otherwise, upon either the pulse or the temperature, nor has there been any "melting away" of the membrane. As to the untoward effects, albuminuria has been observed rather more frequently, but casts and other evidence of nephritis have been absent. With the exception of simple regurgitation, due to temporary paresis of the palatal muscles, post-diphtheritic paralysis has been noteworthy by its absence.—*International Medical Magazine*, 1896, No. 12, p. 818.

Antidiphtheritic Serum and Loeffler's Solution.

Dr. Burt Russell Shurly reports twenty-five cases, of which two died. The formula of the solution is as follows: Menthol, 10; toluene to 36; to this are added creolin, 2; solution of iron coloride, 4; and alcohol to 100. A small piece of absorbent cotton is wrapped about a wire applicator and, saturated with the solution, is firmly pressed against the exudate for from ten to twenty seconds, at intervals of from three to four hours. Twenty minutes after each application the throat is irrigated with hydrogen peroxide, 1; listerine or euthymol, 1; and Dobell's solution or aqua calcis, 3 to 5. The diagnosis of diphtheria was verified by bacteriological examination. Among the facts observed are the following: No patient died who was treated within two days of invasion. None developed laryngeal stenosis after antidiphtheritic serum was given. None developed anuria, convulsions, abscesses, nor became septic. Albuminuria without casts developed in eight cases. Paralysis appeared in four cases, rash in eight. He concludes that the subsidiary local and constitutional treatment must not be neglected, and that antitoxin is a specific remedy when used early.—*Therapeutic Gazette*, 1896, No. 2, p. 81.

Snake-venom Antitoxin.

Mr. E. H. Hankin states that the poison secreted by the microbes of tetanus and diphtheria are closely allied to, if not indistinguishable chemically from, the poisons secreted by venomous snakes. Mitchell and Wol-

fenden have discovered that the venom of snakes owes its properties to the presence of a poisonous albumin, that of the cobra, according to the author, being so active that for the mouse the lethal dose of the dried poison has been found to be no more than the thirteenth-millionth part of its body-weight. Sewall showed in 1887 that it was possible to make pigeons immune against rattlesnake-venom by injecting into them a series of minute doses of this substance. The question of the possibility of producing antitoxins which might neutralize the poison of venomous snakes has been taken up by Calmette and Fraser. Both have succeeded in producing a high degree of immunity against snake-poison in animals, and both have found that serum of such animals possesses the power of neutralizing cobra-venom. The former claims that the activity of his antivenine is ten thousand units. There is little doubt that antivenine would produce immunity in a safe and easy way if injected an hour previous to the bite, and in a small dose. While it is easy to produce an immediate though temporary immunity, it is comparatively difficult to effect a cure when once the symptoms have arisen. Hence, the one hope of success is to inject the remedy at a sufficiently early stage after the bite. The limb should be well ligatured, in hope that the remedy may be absorbed into the system in advance of the poison. Since death within half an hour after the bite of a venomous snake is the exception, and since, as a rule, more than three hours elapse before the fatal issue, and further that antivenine, even when used an hour and a half after the bite of extremely venomous snakes, has been found to be efficacious, there is good reason for expecting favorable results from this treatment, which has been found to be active against the poison of all species of snakes in which it has hitherto been tried. The injection is made under antiseptic precautions, into the subcutaneous cellular tissue of the flank. Then with the same syringe injections of aqueous solutions of lime chloride (1 to 60) are made about the bite which has been previously washed with the same solution. Neither alcohol nor ammonia should be administered, since these may interfere with the action of the remedy.—*Indian Medical Gazette*, 1896, No. 2, p. 56.

The Serum-therapy of Variola.

M. A. Béclère reports that a woman, aged twenty-nine years, entered the hospital on the third day of the eruption. She received under the skin of the abdomen, within an hour, about fifty ounces (one-fiftieth of her body-weight) of the serum of a vaccinated heifer. The patient was rapidly and perfectly cured without any general or local disturbance from this enormous injection of serum. She had been vaccinated but once, and that was at the age of two years. Thirty-two days after the injection desquamation had been completed. The author claims that this treatment is rational and legitimate when applied in sufficiently large quantities, the serum being drawn from healthy animals and all antiseptic precautions being observed.—*Journal des Praticiens*, 1896, No. 14, p. 51.

[However in this carefully reported case it may be remarked that the treatment did not prevent suppuration, there were some pain and erythema at the site of the injections, and there was late (nine days after injection) erythema resembling urticaria.—R. W. W.]

Anticholera Inoculation.

Dr. W. M. Haffkine concludes his elaborate report of his operations in India as follows: The physiological and pathological effect in man has been studied on some sixty persons, mostly medical and scientific men, and found to be harmless. During the first year 22,703 people of all classes were inoculated. In the second year 19,473 individuals, in some of the most affected localities of India, were inoculated. The results obtained seem to indicate that in the inoculations we possess a means of effectively combating cholera-epidemics.—*Report to Government of India*, 1895.

[A careful study of tables leads to the belief that the above-stated conclusions are based upon sufficient evidence.—R. W. W.]

Serum-therapy by the Intestinal Route.

M. Chantemesse, seeking to obviate the pain and other accidents of subcutaneous injection, has made twenty experiments which convince him that the serum is readily absorbed by the intestinal mucous membrane, and at the same time does not give rise to any inconvenience. The rectum is washed out and the injection made. There is no pain nor any disagreeable manifestation, not even erythema. Its efficiency is equal to that by former methods, and as a preventive it appears to be of the same value in equal dose. Six to ten ounces of Marmorek's serum in severe erysipelatous infection have been injected without inconvenience. In three cases of diphtheria Roux's serum has appeared to be equally efficacious when used in this way.—*Journal des Praticiens*, 1896, No. 6, p. 93.

The Treatment of Tetany by the Thyroid Extract.

Dr. Max Levy-Dorn, noting that tetany as well as myxœdema has not rarely been observed after extirpation of the thyroid gland, suggests this treatment. The patient presented none of the symptoms of myxœdema and possessed an apparently healthy thyroid gland. Tablets, one to three daily, consisting of four grains of thyreoidin, were used for about a month with the result that the symptoms had entirely disappeared. Four months later it was found that there was no recurrence, so that it may be assumed that the cure was perfect.—*Therapeutische Monatshefte*, 1896, Heft 2, S. 63.

The Treatment of a "Common Cold."

Dr. L. Duncan Bulkley recommends the use of sodium bicarbonate in amounts of from twenty to thirty grains in two or three ounces of water every half-hour for three doses and the fourth to be taken at the expiration of an hour from the last one. Two to four hours are then allowed to elapse to see what effect has been obtained, when the four doses are to be repeated, if it is necessary, as is frequently the case. After waiting two to four hours more, the same course is to be taken again, although this is not often necessary, if the treatment has been begun early in the course of the "cold." This method relates more especially to the early stage. To be promptly effective, it should be commenced with the earliest indications of coryza and sneezing.

After the second or third day it acts less promptly and more frequent repetitions are needed. When the influenza has more of a contagious character it is less efficacious, but still is often of service. In these cases five to ten grains of phenacetin with ten to twenty of sodium bicarbonate with hot water given every two hours continuously for a day or two give excellent results. The *modus operandi* of the treatment is based upon the idea that there is an acid condition of the system which is sufficient to irritate the terminal endings of the nerves in the skin and mucous membranes, and to render them susceptible to impressions of cold by a derangement of the capillary circulation. The remedy seems to act by relieving the internal cause of the surface irritation. The dose so often repeated has never given rise to any later ill effects.—*The Medical Record*, 1896, No. 1315, p. 86.

The Hæmatogenic Power of the Heavy Metals.

Dott. Giusto Coronedi believes that other metals than iron may favorably influence general nutrition. Experiments based upon the use of Fleischl's hæmoglobinometer give the following relative value of the metals in their action upon hæmoglobin: Mercury, 17; iron, 13–15; copper, 10; manganese, 9; zinc, ?. Mercury, however, because of its poisonous properties must yield the first place to iron. Copper-hæmol, as prepared under the direction of Kobert, can be administered in pill-form with mucilage, each containing one and one-half grains, of which the daily dose is from three to four. In this way an excellent result was obtained without gastric disturbance, in a case of profound anæmia consecutive to severe chronic gastritis.—*La Settimana Medica*, 1896, No. 1, p. 9.

Cold Baths in Delirium Tremens.

M. Letulle notes the various drugs which have been used, and recommends bathing, not the simple douche, more or less prolonged, but immersion of the whole body, even to the shoulders, in water at the temperature of 64.4° F. Further, the head should be cooled by large waves of water of the same temperature, and this should be persisted in for the same time as the bath, which should last 8, 12 to 15 minutes, according to the reaction of the patient. These baths may be repeated every two or three hours. In two instances, reported in detail, the gravity of the condition was such that favorable results were not hoped for. Although from this number of cases no rules can be formulated, the conclusion may be suggested that these baths possess a sedative and calming action upon these cases.—*La Presse Médicale*, 1896, No. 4, p. 20.

The Treatment of Inoperable Malignant Neoplasms by Aniline-dyes.

Dr. R. v. Mosetig-Moorhof has made use of this method for the past six years. The colors employed have been methyl-violet, methylene-blue, Bismarck-brown, and methyl-green, generally in 1 per cent. solution by injection. Ulcerations have been treated with strong solutions, with the remedy in the form of powder, and fistulous tracts by pencils. Methylene-

blue, which is readily soluble, has been given internally in dose from one and one-half to five times that quantity in form of pills, with extractum scordii or teucrin, as a vehicle, which enables it to be well borne by the stomach. This drug may give rise to a greenish-blue urine, but to no other untoward symptoms. To demonstrate if the accidental injection into a vein would give rise to dangerous symptoms, both methylene-blue and methyl-green were injected into the veins of a dog; no unpleasant results followed. When cachexia resulting from neoplasms exists, this is markedly benefited by administration of the aniline colors *per os*. Observations show that not only does living tissue take up the dyes, but also that cell-material can reduce them, and that they are carried along the lymph-channels. This method resulted in general improvement of the patient's condition, lengthening of his life, and the reduction in size of the tumor of the cases reported four years ago: 1. Myeloid sarcoma of the body of the lower jaw treated by pyoctanin; lived for sixteen months in generally good condition and able to work, and died from croupous pneumonia. On necropsy there was only a small remnant of the sarcoma, but no metastases. 2. Large sarcoma of the retro-peritoneal space; lived for five years in good general condition, and died from influenza. 3. Markedly reduced tumor; worked as a caretaker, and died seventeen months later from pleuro-pneumonia. To these is added a recent case of villous carcinoma of gall-bladder which was treated by enucleation followed by pencils of methylene-blue, and later by three grains of the same each day, by the mouth, in addition. For several months there was steady improvement, until communication became established between the duodenum and the fistulous opening remaining after the operation, which resulted in death. Other reported cases are alluded to, and the author, from his large experience, sees no reason to revoke the opinion previously expressed.—*Centralblatt für die Gesammte Therapie*, 1896, Heft l. S. 1.

A New Method of Antiseptic Wound-treatment.

Dr. C. L. Schleich states that if a watery solution of gelatin be dried after exposure to formalin-vapor, there results a new chemical body possessing entirely new properties. This preparation in contact with animal tissues results in the breaking up of the absorbable gelatin, lasting for several hours, and the gradual setting free of the formalin. In this way the action of the drug is continued over a considerable period of time. The results of the use of this antiseptic in powder-form have been that in one hundred and twenty cases of acute purulent processes, ninety-three of aseptic healing of wounds, four complicated fractures, and two deep wounds of the scalp, success without exception has been obtained. In all instances of acute suppuration the inflammation has been brought to an end within twenty-four hours, the fractures healed aseptically and without fever, and aseptic operations pursued an uneventful course. In the presence of fresh blood and clean condition of the wound the powder gave rise to a dry and permanent scab. In recent suppuration without necrosis the process was brought to a standstill within twenty-four hours. Boils, carbuncles, and phlegmons can be limited within the same time if the powder is brought into contact with the tissues. The process of manufacture is as follows: A pound of dissolved and purified

gelatin is brought in contact with twenty-five drops of a pure solution of formalin. The dried masses are rubbed up or powdered, and preserved dry with the addition of some drops of formalin.—*Therapeutische Monatshefte*, 1896, Heft 2, S. 57.

Vaseline Spray in the Treatment of Chronic Nasal Inflammation.

Dr. Thomas F. Rumbold, after twenty-three years' experience, feels justified in asserting: (1) That we have no agent nearly so valuable as a local application to the upper air-passages as vaseline; it is the most useful cleanser and antiseptic, and the most rapid of all solvents of abnormal nasal secretion, whether in the semifluid or solid form, that has ever been employed. (2) That there are no means of making local applications that nearly equal properly constructed spray-producers whose action is perfectly non-irritating, while most thorough in reaching the unseen surfaces that are almost always diseased. The objects of this treatment are: (1) To remove the abnormal secretion from the inflamed mucous membrane; and (2) to apply a warm, soothing antiseptic to every portion of the inflamed nasal passages. The treatment should be perfectly painless, and is made by instruments carrying the spray in four different directions and actuated by an air-pressure of from two to eight pounds to the square inch. In all cases, especially in those in which there is much muco-purulent discharge, a small quantity—barely enough to taste—of eucalyptol is added.—*St. Louis Medical and Surgical Journal*, 1896, No. 3, p. 147.

The Treatment of Tetanus.

Dr. E. F. Trevelyan reports a single case of cephalic tetanus treated by injections of antitoxic (antitetanic, Roux) serum. This was without result, although two successful cases have been reported by Caretti and by Einsti and Buonati. This disease is also known as *tetanus hydrophobicus* owing to the pharyngeal spasm induced by attempts at swallowing, *tetanus paralyticus* as proposed by Klemm to emphasize the importance of the facial paralysis, and bulbar tetanus to accentuate the fact that bulbar symptoms are so frequently present. There is, however, no real difference between cephalic and ordinary tetanus, as is shown by the fact that the muscular spasm tends to become general in both; in fact, it is only a difference of mode of ingesta, the former resembling more closely experimental tetanus. Failure in this case may have been due to an insufficient quantity used or to the use of the warm water in dissolving the desiccated serum. This is the third instance in which the author has observed the use of the remedy—in one the Tizzoni-Cattani serum was employed—and in all it did not appear to have the slightest effect upon the disease.—*British Medical Journal*, 1896, No. 1832, p. 321.

The Defects in the System of Artificial Respiration.

Dr. A. E. Wright calls attention to certain grave defects in the system as ordinarily applied to the treatment of chloroform-collapse and asphyxia. He recommends opening a major artery before proceeding to apply artificial res-

piration. Under ordinary conditions we undertake to drive air in front of the aërated blood, a considerable volume of vitiated blood, and also to overcome a very considerable resistance in the arteries. His method provides an outlet through which we can evacuate the greater part of the vitiated blood and can reduce the arterial resistance so that the enfeebled heart can resume its beat. In man it would be well, in case of chloroform-collapse, carbon-dioxide-poisoning, drowning, and asphyxia, to open both temporal arteries. To prevent the fatalities which occur in the early stages of chloroform administration preliminary injections of atropine are of eminent utility.—*British Medical Journal*, 1896, No. 1830, p. 203.

The Treatment of Rheumatism.

Dr. Louis Fangéres Bishop states that in the presence of an acute attack we should give salicylic acid, either as salicin, oil of wintergreen, or fresh sodium salicylate, in sufficient quantities to relieve pain and lower the temperature. The failures arise from insufficient quantity of the drug, either from lack of appreciation of the necessity, or because some patients cannot stand it. Alkalies are generally believed to protect the heart, and are best administered as sodium bicarbonate in drachm doses as often as is practicable until the urine becomes alkaline. For chronic rheumatism twenty grains of salicin every two hours should be given until relief of pain, then continued in the same dose three times daily. The digestion should not be overtaxed; carbohydrates, as potatoes, should be limited. Milk is a very good food, and cod-liver oil is often extremely beneficial.

Dr. Beverly Robinson did not think it was best to give large amounts of the salicylates because of their depressing effect, and it was well to combine with them a little colchicum. He had also used ammonium chloride and potassium acetate, ten to fifteen grains of each every two hours, with good results.—*Medical Record*, 1896, No. 1317, p. 150.

Creosote-poisoning.

M. Faisans reports that a student of pharmacy, aged twenty-six years, suffering from pulmonary tuberculosis in the second stage, had been treated by injections of creosote oil, 1 to 15. For three weeks he had received these injections in daily doses of from two and one-half to thirty-five drachms of the oil. The symptoms resembled those of tuberculous meningitis, but the absence of fever, vomiting, constipation, stiffness of the neck, convulsions, irregularities of the pulse, and respiratory movements sufficed to make the diagnosis, which was confirmed by the recovery of the patient. Besides the well-known toxic symptoms of this drug, black urine, profuse sweats, depressed temperature, creosote may determine accidents which constitute a new variety of pseudo-meningitis.—*Journal des Praticiens*, 1896, No. 4, p. 61.

Duboisine-poisoning.

Dr. C. A. Veasey reports a single instance, that of a woman, aged twenty-seven years, who instilled one drop of a 1 to 240 solution into each eye.

She shortly after felt heated and flushed, and soon it was almost impossible to walk. Forty minutes after the instillation she talked in an incoherent manner, could not walk without assistance, her gait was of a draggy character, and she was intensely excited. The throat was exceedingly dry, the pupils moderately, but not fully, dilated. The face and hands were flushed, resembling a scarlatinous eruption; the pulse was small but strong and rapid, 128 beats to the minute; the respiration shallow and hurried, 28 to the minute. Within the next half-hour the patient lost all control over herself, not being able to raise her head, arms, or legs without assistance, though she was at times able to move her fingers. The flush was now disappearing and she was becoming pale in spots; the speech was reduced to an occasional whisper and no proper replies to questions could be obtained. The pulse had also become soft and compressible, though but slightly reduced in rapidity; and the respirations had fallen to 14, and were still shallow. There seemed to be partial anæsthesia. After lasting for three hours these symptoms began to disappear gradually and within an hour the patient was able to take a carriage.—*The Philadelphia Polyclinic*, 1896, No. 13, p. 121.

A Suggestion in Ether Administration.

Dr. David H. Ludlow states that when ether is mixed with twice its volume of a bland, light preparation of liquid pretroleum and thoroughly nebulized with a suitable atomizer, it is absolutely unirritating, and even with a much smaller proportion of oil is practically so. A little cocaine (the alkaloid) may, if desired, be dissolved in the ether before adding the oil, but it is unnecessary. The oil, by preventing the irritation (not merely cutting off the connection with the central nervous system as the cocaine does), avoids not only immediate reflex disturbances, but all direct injury to the mucous membrane, and also, consequently, the later reflexes, which, with cocaine alone, are likely to be troublesome after the local anæsthesia has passed off. A few puffs of the mixture from the atomizer directly into the nostrils before administering ether in the usual way result in the anæsthetic being easily taken, without stage of excitement and with practically none of the common annoyances incident to its use. In this way it is hoped that the objectionable features of ether-anæsthesia, which are to be attributed directly or reflexly to its irritation of the mucous membrane, can be lessened or prevented.—*The Philadelphia Polyclinic*, 1896, No. 6, p. 55.

Water-parsnip-poisoning.

Dr. Hermann Grad reports two cases. Two boys, aged thirteen and fifteen years, ate some roots, found in a swampy place, which they took to be parsnips. The younger one felt sick, perspired freely, was pale, his head was drawn to one side, but there were no convulsions. As a result of emetics he vomited freely, his face twitched a few times, but he made a rapid recovery, and ate a good breakfast the following morning. The elder vomited slightly, was pale, and perspired freely, and about three hours later became unconscious, the pulse was full and slightly accelerated, the breathing deep and noisy, all the muscles of the face twitched so that at times his mouth

would be tightly drawn together, the face would become deathly pale, and the skin covered with cold perspiration. Suddenly the twitching would cease, but in a short time the fingers would again begin to move, and with extreme rapidity the convulsions would become general. The head would be drawn backward, the breathing entirely suspended, the pulse feeble and at times imperceptible, and the mouth and nostrils covered with froth of a strawberry color. He had three convulsions in about thirty minutes, the last one of longer duration than the others, and soon died. The root was planted, and when grown was identified as the *Cicuta maculata*, or water-parsnip.—*Pædiatrics*, 1896, No. 3, p. 102.

Sulphonal in Enuresis.

Dr. J. Madison Taylor recommends this drug to be taken at night, in a large dose—6 to 10 grains—and as well in smaller doses—2 to 4 grains—during the day. Believing that instability of the nervous equilibrium is the essential factor, and some one of the various reflex irritants the supplemental cause, he concludes that enuresis does not take place in an entirely healthy child.—*Pædiatrics*, 1896, No. 4, p. 163.

New Methods in Treatment of Malarial Fevers in Infancy.

Dr. Moncorvo has used phenoclol hydrochloride in doses of from five to thirty grains each twenty-four hours, generally administered in solution, in fifty-five cases. It has generally been well tolerated, and rendered good service in several cases in which it was difficult or impossible to administer quinine, but it cannot be said to possess any advantage over quinine in pernicious fevers. In mild cases it is useful and safe even when the kidneys are somewhat diseased. Asaprol has been easy of administration on account of its solubility, its slightly bitter taste being concealed by an aromatic syrup, as that of peppermint, and it does not give rise to any outward symptoms. It can be used in doses of from five to forty-five grains *per diem*. Eighteen cases are cited, and in but one case did it fail, and that was also tuberculous, and further complicated by severe broncho-pneumonia. In this case the fever resisted also antipyrine and quinine. In a child who suffered from malaria and chorea both conditions were relieved by a daily dosage of seventy-five grains.—*Gazette hebdomadaire de Médecine et de Chirurgie*, 1895, No. 50, p. 590.

Antipyrine for Conjunctivitis.

Dr. A. E. Anderson desires to call attention to the value of this drug as a remedy for conjunctivitis, acute, chronic, and granular. He uses a 10 per cent. solution, applying this to the tarsal conjunctiva with a pledget of cotton, taking special care to push the cotton well up into the retrotarsal fold. Then follow a momentary sensation of pain and a gritty sensation, causing the patient to blink, which soon disappears. For use at home thrice daily, a 4 per cent. solution may be ordered.—*Therapeutic Gazette*, 1895, No. 12, p. 863.

MEDICINE.

UNDER THE CHARGE OF

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A Little-known Occupation-neurosis.

Bernhardt (*Neurolog. Centralblatt*, No. 1, 1896) calls attention to a painful condition affecting especially the region of the external epicondyle of the humerus and occasionally the head of the radius. There are no objective symptoms, but the patients complain of pain beginning in the location mentioned and sometimes extending down the forearm to the wrist, or even to the fingers. The pain is increased by various motions, such as closing the hand, extending it, grasping tools, or even by holding a pen, and so interferes with various occupations. At rest the pain is slight or absent. There is no paralysis, no alteration of electric excitability, and no trophic lesion, nor is the general health affected. Of thirty cases carefully studied twenty-seven affected men, three women. With one exception all the patients were above the age of thirty. Various occupations were represented, and in almost all cases overexertion, especially of the affected arm, was alleged by the patients. In three cases there was a history of traumatism. In twenty cases the right arm alone was affected. In connection with the history of overexertion the author calls attention to the numerous important muscles attached to the points especially involved, the excessive use of which might easily cause irritation of the periosteum. In two cases the internal epicondyle was sensitive. The course of the disease is often chronic, but the prognosis good. Rest is essential in the treatment. In severe cases leeching is beneficial, and may be followed by wet packs, and later by applications of iodine.

The condition is mentioned by Remak in his article on "Occupation-neuroses," in Eulenburg's *Encyclopædia*. Bernhardt thinks that "cold" may cause a similar condition, though overexertion is the principal factor.

Aspergillar Pseudo-tuberculosis.

Rénon reports two cases of this rare and interesting disease, which has, up to the present, been regarded as a professional affection attacking pigeon-feeders.

Rénon's cases, however, occurred in a man and his wife who were occupied in combing and sorting hair. The hair if dry was combed in this condition, but if moist was first sprinkled with rye-flour to prevent kinking and breaking. The use of this flour gave rise to a good deal of dust.

The wife, after having worked for seven years, was taken with frequent hæmoptysis, and had the signs of a tubercular lesion in the first stage in the left lung.

The husband was taken nine years after beginning the occupation with violent attacks of hæmoptysis lasting over a period of eighteen months, and showed signs of a healing cavity in the left lung with a generalized bronchitis.

In neither case did the sputum show tubercle-bacilli, and six guinea-pigs inoculated with it (three from each case) were killed after forty-two days, and showed absolutely no lesions of tuberculosis. On the contrary, much mycelium was found in specimens of the sputum appropriately stained, and culture-experiments showed the aspergillus fumigatus to be present. Animals inoculated with these cultures promptly succumbed with typical aspergillar lesions, and the organism was again recovered from their organs. The dust from the room and the rye-flour inoculated upon suitable media showed the presence of the aspergillus fumigatus, the hair itself being free from it.

It was noticed that dogs and birds were unable to live in the workshop, the former succumbing after some months, the latter after a few weeks, after showing emaciation and coughing a good deal.

Out of six pigeons which were subjected to inhalations of the dust from the affected room, five died with lesions of aspergillus-infection, the sixth recovering, but showing at autopsy healed lesions.

The author concludes that the infection in these cases came from the dust of the room, more particularly that from the flour.

Rénon thinks that millers and all workers with grain are liable to contract this disease, and cites the fact that aspergillar keratitis has been found in millers.—*Comptes Rendus de la Société de Biologie*, November 1, 1895.

Relapse in Pneumonia.

Ruge describes the peculiarities of relapse in croupous pneumonia, based on a study of two cases under his observation, and seven reported by others. Between the two attacks there is an afebrile period of from four to fifteen days. During this time the subjective sensations are those of convalescence. The physical signs disappear, at least partially. The duration of the relapse varies from four to eight days. The part of the lung affected is usually the same as in the first attack. Such cases differ from wandering pneumonia, as Ruge showed by an analysis of eighteen cases, by the longer course of the latter. Transition-forms no doubt occur. The frequency of relapse in pneumonia is stated by various authors as from 0.18 to 0.45 per cent.—*Charité Annalen.*, 1895, p. 184.

On the Anatomic Changes in Huntington's Chorea.

Kronthal and Kalischer (*Virchow's Archiv*, Bd. 139, H. 2) report a second case of hereditary chorea with autopsy. The changes resembled those in their former case. (*Neurologisches Centralblatt*, 1892, Nos. 19, 20.) There were alterations of the pia; atrophy of the convolutions; thickening and degeneration of the vessels of the cortex; increase of nuclei or small-cell infiltration of the cortex; alterations of the ganglion-cells of the brain

and cord and diffuse degeneration of the white matter of the cord. In the previous case adhesions of the pia and cortex, cavities, minute hemorrhages, and sclerosis of the gray matter of the brain predominated; in this one small collection of round- and spindle-cells in the cortex and subcortical layer were numerous. Fully realizing the difficulty of distinguishing secondary from primary changes in this disease the authors come to the conclusion that the primary seat of the changes which cause the choreic movements is in the cortex, consisting essentially in vascular disease, cellular infiltration, increase of nuclei, small hemorrhages, and increase of the glia and the interstitial connective tissue. The actual cause of these changes remains unexplained.

Acute Leukæmia.

An important contribution to the study of leukæmia is made by A. Fraenkel (*Deutsche med. Wochenschrift*, 1895, Nos. 39–43, and 45). He had the unusual experience of seeing ten cases of this disease within a short time. Six of the patients were males, four females. Four were between thirteen and eighteen years of age, six between twenty-four and thirty-four years of age. The duration of the disease varied from twenty days to sixteen weeks. Even in the cases of comparatively long duration the onset was sudden and similar to that in the more rapid ones. Hemorrhagic diathesis was an early feature. In eight cases in which examinations of the blood were made a striking similarity was found, the condition being quite different from that in chronic leukæmia. The leukæmic character of the blood was found to be due to a great increase of mononuclear cells of various sizes, but having the structure and the staining-peculiarities of lymphocytes. The larger of these have large nuclei, almost filling the body, sometimes irregular in shape, or in various stages of division. They do not stain deeply. Eosinophile and neutrophile myelocytes were not present, but basophile granulations occurred. The number of polynuclear cells was extremely small. In three cases mitoses were found, but not in all parts of the capillary system, so that Fraenkel believes that this process may occur in certain parts in which the conditions are favorable, perhaps on account of slowing of the current, as suggested by Troje. Nucleated red corpuscles were usually rare. Preparations from various organs show that the mononuclear cells are formed especially, but not exclusively, in the lymph-glands. There is lymphæmia in the wide sense; the young forms of cells do not pass on into the more mature forms. The proliferation of the lymphocytes must take place with great activity and they must soon enter the circulation, hence the clinical picture.

From the similarity of the symptoms and the condition of the blood a single etiological factor would seem probable in all the cases. The course seems to point to an infection. In two cases the absence of bacteria in the blood was demonstrated. The possibility of infection from the alimentary canal must be remembered, however, and Fraenkel shows that the early and constant implication of the cervical lymphatics suggests an invasion from the mouth or pharynx.

In two of the cases an intercurrent bacterial infection was followed by rapid decrease of the number of leucocytes, without an increase of poly-

nuclear forms. This has also been observed by others, and Fraenkel alludes to the possibility of using such observations in devising treatment.

Sudden Death from Embolism of both Coronary Arteries.

At a recent meeting of the Berlin Verein für innere Medicin Oestreich demonstrated the heart of a thirty-two-year-old man, who died in coition on his wedding night. Just above the right aortic valve was a pediculated mixed thrombus, doubtless originating in an atheromatous ulcer. In both coronary arteries were emboli, evidently derived from the large thrombus, as the coronary arteries themselves were not atheromatous. The probable cause of the atheroma at the comparatively early age of the patient is not mentioned.—*Centralblatt für innere Med.*, 1896, No. 2, p. 55.

Sodium Salicylate and the Formation and Excretion of Uric Acid.

The practice of giving salicylates to increase the excretion of uric acid, urged by Haig and others, seems to require a revision on the ground of certain observations of Bohland (*Centralblatt für innere Med.*, 1896, No. 3). The latter found that although the administration of salicylic acid is in fact followed by an increase in the excretion of uric acid, there is also a marked increase in the number of leucocytes. According to the theory of Horbaczewski, confirmed by some others, the increased excretion of uric acid in these cases could be explained by the increase of leucocytes and their subsequent break-down. According to Neusser, in gout and the uric acid diathesis in general the leucocytes are increased; and if this is exaggerated by the administration of salicylic acid, there is risk of aggravating the local symptoms in the joints, as well as augmenting the size of concretions which may be present.

Iodine in the Thyroid Gland.

One of the most interesting discoveries in physiological chemistry is that recently made by Baumann, who found iodine in the thyroid gland. This occurs in close combination with a complex body which gives no albumin-reactions, but contains phosphoric acid in small quantities, and is perhaps a derivative of nucleic acid. To the iodine-combination the name thyroiodin is given by the manufacturing chemists who make it after Baumann's method. Iodine exists in the newly isolated body in considerable proportions: in one preparation 2.9 per cent.; in another, further purified, 9.3 per cent. The actual proportion is about one milligramme of iodine to a gramme of dried gland. The preparation was obtained from sheep-thyroid, but the human thyroid was shown to contain the same or a very similar body. Iodine was also found in the thyroid glands of hogs, but not in that of cattle. In a colloid goitre (preserved for a long time in alcohol) the amount of iodine was very small.

The discovery is, of course, of great interest in connection with the treatment of goitre and seems to go far toward explaining the action both of iodine and of thyroid preparations. The superior activity of thyroid over

iodine in many cases might be explained, as Baumann says, by the fact that the latter serves to assist in the formation of the necessary substance which in the gland is already present.

Acting on a suggestion of Kocher, Tschirsch tried to find iodine in the thyroid gland, but was unsuccessful by reason of a faulty method. Baumann points out the great importance of the discovery in physiology and in organotherapy. Further particulars are promised by the author and his pupil Roos.—*Zeitschrift für Phys. Chem.*, Bd. xxi., Heft 4.

Treupel has used thyroiodin in a case of sarcoma of the pelvis with metastases in the thyroid. The preparation was given at first with the idea of differentiating between primary struma and other possible causes of enlargement of the thyroid, but the case furnished interesting material for studying the effect of the preparation on metabolism. The amount of thyroiodin given in one day corresponded to one gramme of the fresh gland. No alteration of the temperature was observed, the pulse became slightly irregular, and palpitation of the heart occurred. The most important effect was an increase of the amount of urine excreted, and a decided increase in the excretion of urea. As the author shows by a careful analysis of the literature the experiment proves that the action of thyroiodin is identical with that of the gland itself.—*Münchener med. Wochenschrift*, 1896, No. 6.

Icterus from Lactophenin-intoxication.

Wenzel (*Centralblatt für inn. Med.*, 1896, No. 6) reports the case of a man of thirty-four years, who had become a morphinist in consequence of neuralgia. In the effort to overcome the habit various sedatives were used. Among these lactophenin was given in the dose of one gramme daily. For two weeks this was well borne, though without lessening the neuralgic pains. There were no symptoms on the part of the alimentary tract. Suddenly intense jaundice appeared, the stools became acholic, the urine dark, with yellow foam and bile-coloring reaction. There was no pruritus, no slowing of the pulse, no fever. The stools were clay-colored for about ten days, and then gradually assumed the normal appearance. The other symptoms lasted several weeks. At the height of the disease nausea and vomiting occurred, but were not severe. The appetite was hardly affected at any stage. Wenzel attributes the icterus to the action on the red blood-corpuscles of paramidophenol, the useful but at the same time toxic element of lactophenin, as also of many other recently discovered analgesics and antipyretics.

Strauss (American Journal of the Medical Sciences, March, 1896, p. 341) had previously reported three cases of poisoning from lactophenin with symptoms similar to those in Wenzel's case, but in the former enormous quantities of the drug had been taken, *i. e.*, 36, 56, and 84 grammes respectively. The influence of idiosyncrasy in such cases is perhaps very important.

An Unusual Case of Ascites.

Pütz (*Deutsche med. Wochenschrift*, Beilage 5, p. 35, February 20, 1896) reports the case of a man of sixty-two years, healthy up to 1890, who, after the usual early symptoms of cirrhosis of the liver, developed ascites in

March, 1891. He was tapped the first time April 3, 1891, nine litres of ascitic fluid removed, and improved very much, so that a second tapping was not necessary until the end of January, 1892. A third operation was made in the following May. After that the intervals became shorter, so that toward the last fluid had to be removed every nine or ten days. Death occurred four days after the forty-seventh tapping. The duration of the disease is not stated, but would appear to have been about four years. In this time 1186 litres by measure, or in round numbers, including the fluid which trickled from the wound, 1200 litres of fluid were removed, or about seven times the weight of the patient.

SURGERY.

UNDER THE CHARGE OF

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RADICAL OPERATION OF REDUCIBLE HERNIÆ.

GREIFFENHAGEN (*St. Petersb. med. Woch.*, December 28, 1895), after discussing the position of this operation at the present day, says the mortality of non-incarcerated herniæ that are not complicated by the resection of intestine or mesentery is rapidly decreasing, until at the present day the mortality is practically nil and all patients, or nearly all, recover. For instance, Macewen reports 82, Kocher 220, Bassini 239, Boca 250 cases, in which no death occurred. This shows that the radical operation for non-strangulated herniæ is at the present time a harmless operation.

That, however, is not sufficient. What are the permanent results? Especially of inguinal herniæ, do they show permanent cures?

The percentage of relapse, as given by known authorities of their operations, is the following: Schede, 10 per cent.; Kocher, 8.6 per cent.; Kuster, 6 per cent.; Wolfler, 5 per cent.; Bassini, 3 per cent.; Macewen, 0.6 per cent.; and Kocher, by his latest method, 0 per cent., or 100 per cent. of permanent cures. Of course, the observation of these cases has only been for a limited length of time in some cases, but the two things necessary for the success of the operation are however established—its harmlessness and the certainty of a radical, permanent cure.

The present status of the operation has entirely altered the indications for operation. It should be performed in all cases of herniæ that cannot be re-

placed or are difficult to retain by a truss, and that have shown a tendency to inflammation.

Further, the operation is indicated in the following conditions:

1. In all free herniæ that are difficult to retain or are only partially retained by a truss and where the truss cannot be worn comfortably.

2. In middle-aged and young persons of the working-classes, who cannot afford to buy a good truss and renew it when necessary.

3. In children, and especially in large herniæ.

4. Finally, patients should be operated upon if they so desire and wish to be free from the inconvenience attending the wearing of a truss.

The contraindications are a hernia so large that it cannot be returned into the abdominal cavity, and systemic conditions that contraindicate all forms of operation.

The best results are obtained in small, free, relatively recent herniæ in young persons, in which there have been no adhesions formed and there is not much motion. The greater the amount of adhesion between the sac of the hernia and the canal the more difficult is the technique and the less are the chances of a permanent cure.

The author is divided in his opinion as to the best operation, preferring, according to the case, Macewen's, Kocher's, Bassini's, and Frank's methods.

Five Unusual Cases of Abscess in Connection with the Vermiform Appendix.

White (*The Practitioner*, November, 1895) reports five cases, the first four of which illustrate the fact that we should always bear in mind that any suppuration within a radius of six inches from the cæcum may arise from disease of the appendix. One of the cases, in which the abscess presented just above Poupart's ligament on the left, illustrated this, as the abscess was found to arise from the appendix. The author also mentions a post-mortem case, in which the abscess, pointing through the right saphenous opening, was found to be connected with the appendix. The fourth case shows that many instances of right-sided perineal abscess owe their origin to the appendix. This has also been demonstrated to the author post mortem. Operative interference was easy in the case reported, in two of the other cases an exploratory laparotomy led to the rupture of the abscess into the general peritoneal cavity, while the other case got well without operation.

The author directs attention to the fact that often in these cases the temperature is but little raised.

In two of the cases reported the liver suffered. In the first the abscess came in contact with the superior mesenteric vein, and caused thrombosis with resulting multiple secondary abscesses in the liver. The author believes that it is excessively rare for this to happen. In the other case there was a single large abscess in the liver in association with an abscess in connection with the appendix. This is described, but it, too, is very uncommon.

The Streptococcus and Antistreptococcic Serum.

Marmorek (*Annales de l'Int. Pasteur*, November 7, 1895; *Cent. für innere Med.*, December 28, 1895), working in the same line as the diphtheria- and

tetanus-serum theories, produced an anti-streptococcic serum which gave the following results in cases of erysipelas:

The mortality before its use was 5.12 per cent. During the period it was used there were 306 cases, 165 of these that were considered severe were injected; the mortality fell to 1.63 per cent., and if certain cases were left out that died from other causes it would be only 1.2 per cent. A weaker serum was then employed, when the mortality rose to 4.82 per cent.

If the dose was sufficient, improvement in the subjective and local symptoms took place five to twelve hours after the injection. The temperature sank rapidly, and came to normal twenty-four hours afterward. If the temperature remained high, the dose was repeated at the end of twenty-four hours.

Albuminuria was never present in patients treated with the serum, and if it was previously present, it disappeared from twenty-four to forty-eight hours after the treatment commenced.

The dose varied according to the patient and the severity of the disease from 10 c.c. to 20 c.c. in severe cases. The total dose never exceeded 120 c.c. in ten days.

Gratifying results were also obtained in cases of puerperal fever, especially where the infection was not mixed, but a pure streptococcus infection.

The Treatment of Infectious Angeiocholitis and Cholecystitis.

F. Terrier (*Rev. de Chir.*, December, 1895) gives the following as a *résumé* of his method of treatment in these cases:

1. Where the biliary passages are involved either directly or indirectly in an inflammatory process, either with or without the presence of calculi, which results in a febrile condition that is intense, either continuously or with marked exacerbations, there is an absolute indication for surgical interference—that is, for a laparotomy.

2. This operation should have for its end the opening of the gall-bladder and the formation of a permanent biliary fistula—that is, a cholecystotomy should be performed.

3. By this operation information of the exact condition of the biliary canals is obtained, including the cystic and vesicular ducts and the ductus choledochus, while complete drainage is furnished for the septic bile which fills the ducts and poisons the system.

4. This form of drainage provides in a manner that is indirect and mechanical for the issue of the septic bile and thus for a disinfection of the bile-ducts, which is much better than the pretended medical treatment so often employed.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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ABNORMAL ASSOCIATED MOVEMENTS OF THE EYELIDS.

W. W. SINCLAIR (Ipswich, Eng.) reports new cases, and collects cases previously reported, making a total of forty (*Ophthalmic Review*, No. 168). These he has analyzed and classified in three series. The *first series* includes thirty-two cases in which certain movements of the lower jaw were associated with an upward movement of the upper eyelid. This series is subdivided into four groups. The first group is of cases of one-sided congenital ptosis, in which the drooping eyelid was raised both when the mouth was opened (by the digastric?) and also when the jaw was directed to the opposite side (by the external pterygoid). The second group is of those cases of one-sided congenital ptosis in which the eyelid was raised when the jaw was depressed, but not when it was moved laterally. In the third group are placed those cases in which the drooping eyelid was raised with lateral movement of the jaw, but not with simple opening of the mouth. Group four includes cases in which associated movements of the upper lid occurred, with movements of the jaw; but in which there is no ptosis. In some of the fourth group ptosis developed later. Up to the present no case has been examined post mortem, and in the present state of our knowledge, Sinclair thinks, some abnormal anatomical connection between the levator muscle and parts of the fifth-nerve nucleus is the simplest explanation of this association of movement.

In the *second series*, of four cases, contraction of the levator of the upper lid was associated with contraction of the internal rectus. Turning the eye in was associated with an elevation of the lid. This was bilateral in all but one of the cases. It might be explained by an unusually close connection between the two third-nerve nuclei.

The *third series* includes five cases collected from the experience of London ophthalmic surgeons, and differing from any cases previously published. They are cases of paralysis or paresis of one external rectus, in which movement inwards of the affected eye was associated with contraction of the orbicularis muscle and retraction of the globe. In one case the enophthalmos was permanent. For this series of cases Sinclair finds no satisfactory explanation, and he thinks they will probably not be correctly explained until the opportunity for a post-mortem examination occurs. In the third series it was the left eye which was affected in every case. In the first series the preponderance of cases in which the left eye was affected was as 2½ to 1.

The first case of these abnormal associated movements appears to have been recorded by Gunn in 1883; but Sinclair believes that such cases are comparatively common, and that many instances have been met with which were merely regarded as curiosities, and not put on record.

Paresis of the Ocular Branch of the Sympathetic.

Panas (Paris) calls attention (*La Presse Médicale*, 1895, No. 64) to this condition, which is liable to be confounded with ptosis due to lack of power in the levator of the upper lid; whereas the weakness is really manifested in the action of the unstriated fibres of Muller and Sappey. The ptosis from paresis of the sympathetic is distinguished from ptosis due to other causes by the coexistence of a contraction of the pupil on the affected side. This contraction is due to weakness of the dilator of the pupil ("internal dilator") similar to the weakness of what Panas styles the "external dilator" or dilator of the palpebral opening. The pupil is free from adhesions and reacts to light and with convergence, but its contraction may not be entirely regular. In severe cases there will also be unilateral flushing of the face, especially when the patient is very warm or subjected to strong emotion.

The prognosis is rather grave, in that the vascular conditions tend to weaken; yet the ocular paresis may remain unchanged after many years. The treatment recommended by Panas consists of the application of electricity to the surface of the lid and over the course of the cervical sympathetic of the affected side, and a tonic regimen. One can try the hypodermic injection of strychnine in the temple. The weakness may be masked for a brief time by the stimulating effects to the fibres involved of local applications of cocaine.

Congenital Night-blindness.

The atypical cases of *retinitis pigmentosa*, as those without the characteristic pigment-deposits, those following acquired syphilis, or those occurring in connection with choroiditis, are so numerous and so varied in their character that it has been easy to group with them conditions which will probably be proven essentially different. One of these conditions has recently been studied by C. W. Cutler, in the clinic of Prof. Fuchs (Vienna), who reports five cases occurring in two families, and gives (*Archives of Ophthalmology*, vol. xxiv., No. 3) a *résumé* of previously reported cases, including records of ten families and two isolated cases, making in all fifty-four cases. To these must be added two cases reported, with references to others, by W. T. Atwool (Torbay, Eng.), in *Royal Lond. Ophthal. Hosp. Rep.*, vol. xiv., part i.

The condition is characterized by the following features, which sharply differentiate it from retinitis pigmentosa: Night-blindness is congenital, and remains entirely unchanged throughout life. The ophthalmoscopic appearances are normal. Cutler notes that in one case the retinal arteries were distinctly narrow. Nettleship described white spots at the macula in some of his cases, and slight or moderate conus has been noted in several cases; but these changes are manifestly accidental as regards the condition in question.

The field of vision for white is normal, or at least not materially contracted. The fields for colors are not greatly contracted. That for red is nearly or quite normal. The fields for yellow and blue are almost identical, and may lie within the field for red. This reversal of fields may disappear under diminished illumination. Central color-perception is normal.

The condition is hereditary, more markedly so than retinitis pigmentosa. In two families it was traced through five generations. In two families it was confined to males, being transmitted through normal females to their sons, like congenital color-blindness; but in the other families both males and females were affected.

The impairment of vision by diminished illumination is very marked. Some of the cases could not venture out of the house alone after nightfall. The father of Atwool's cases, a naval officer, had accidentally walked off the bridge at night on more than one occasion. In Cutler's cases the light-sense tested by Foerster's photometer varied from 1/25 to 1/49, and was unchanged after one hour's adaptation. Cutler points out that the frequent coincidence of night-blindness and blue-blindness is suggestive; but that it would be rash to conclude from this that they are intimately related.

Hydraulic Curetting of the Cornea.

Under this peculiar title Santarnecchi (Cairo) advocates (*Annales d'Oculistique*, vol. cxiv., No. 3) the forcible washing out of corneal ulcers and abscess-cavities. He holds that the complete incision proposed by Saemisch may be very useful in limited vascular ulcers, and may be employed with advantage when an abscess has opened into the anterior chamber; but it is contraindicated for large atonic ulcers, and should be discarded if the abscess opens externally or is not completely open. The actual cautery for the treatment of these conditions he thinks destined to be relegated to the domain of history.

The method put forward is, after instilling cocaine, to attack the surface of the ulcers, or walls of the ulcerated or carefully opened abscess, with a jet of water, applying it over the whole surface, and progressively increasing its violence until the last portion of adherent ulcerated tissue is removed. After this the eye is covered with a protective bandage. To furnish the jet he employs an Anel syringe, the only fault of this instrument being that it does not contain a sufficient quantity of fluid for complete cleansing.

Descending Optic Neuritis Consequent upon Nasal Treatment.

Temporary amblyopia and narrowing of the field of vision, apparently reflex or combined with hyperæmia of the eyeball, following the application of the galvano-cautery to the nasal mucous membrane, have been reported by a number of observers. A. Alt (St. Louis) reports (*Amer. Journ. of Ophthalmol.*, vol. xii., No. 9) a case of a somewhat different and more serious nature.

A man, aged thirty-eight years, had been treated for nasal catarrh and narrowing of the eft nasal passage by means of different applications and the galvano-cautery. He noticed the left eye did not see so well as usual, and mentioned it to his physician. Treatment was persisted in, and two

days later he awoke to find the eye blind. When seen that day by Alt there was doubtful perception of light, the pupil was dilated and scarcely reacting. The margins of the optic papilla were almost invisible, the retinal veins were hyperæmic, the arteries thin. Tension was normal.

The nasal treatment was stopped. On the third day the patient counted fingers at one foot, and on the sixth day at five feet, with considerable increase of the field. A few days later injections of strychnine were commenced, and by the eighteenth day he had regained vision = 20/xxx+, the field being still somewhat narrowed except upward and outward. The arteries were still thin, and papilla almost white.

Afterward Dr. Alt learned that the patient had had syphilis, and he thinks that to this was in some measure due the severity of the attack; but that it could only be accused of being an indirect cause of the trouble by rendering the patient more vulnerable, since only the eye on the affected side was involved, and it improved promptly on mere cessation of the nasal treatment.

Prevalence of Trachoma.

From an extended study of the statistics of trachoma and correspondence with ophthalmic surgeons in all parts of the world, Van Millingen (Constantinople) has reached the following conclusions (*Annal. d'Oculistique*, vol. cxiv., No. 3):

1. Trachoma is an infectious and contagious disease, which predominates in uncivilized countries and tends to disappear with the progress of civilization and hygiene. Hygiene and cleanliness are the best preservatives against trachoma.

2. Trachoma is not influenced by altitude; it may spread wherever the people are uncleanly and live in poverty quite as easily at altitudes of 1000 to 5000 metres as on plains.

3. All races are equally susceptible to the virus of trachoma. An immunity for certain races does not exist.

Treatment of Ocular Syphilis by Mercury, Potassium Iodide, and Pilocarpin.

G. H. Burnham (Toronto) reports (*Archives of Ophthalmol.*, vol. xxiv., No. 3) greatly increased efficiency in the treatment of syphilis of the eye by the addition of pilocarpine to the ordinary mixed treatment. The pilocarpine was given hypodermically in doses of one-eighth to one-fourth grain daily, unless its administration gave rise to nausea, headaches, or oppression over the heart, when it was stopped for a day or two. This was continued two or three weeks, then intermitted, the mercury and potassium iodide being continued through the interval.

Relaxation of the Skin of the Lids.

Under the name of *Blepharochalasis*, Fuchs (Vienna) gives an account (*Wiener klin. Wochensch.*, ix. Jahr., No. 7) of a condition which he finds nowhere accurately described in ophthalmic literature. The affection is

seen in young and middle-aged persons, although the condition of the skin comes to resemble that of senile relaxation and atrophy. The change is confined exclusively to the upper lid, and mainly to the part above the tarsal cartilage. There are repeated attacks of œdematous swelling of the part which at such times hangs down toward the lid-margin like a bag, pale, and as though filled with water. After these attacks the skin feels extremely thin and presents premature grayness, or there may be redness from numerous small distended veins.

The disease is essentially an atrophy of the skin with thinning and loss of elasticity, followed by stretching and atrophy of the subcutaneous tissue. It is comparable with the changes produced in the skin by distention from pregnancy or dropsy. The treatment must be by an operation removing a portion of the relaxed tissue. Fuchs has found that the injection of tincture of iodine or strong alcohol into the subcutaneous cellular tissue of the part, to produce inflammation and subsequent cicatricial contraction, has been followed by little benefit.

Operative Treatment of Entropion and Trichiasis.

J. B. Story (Dublin) holds that a good operation will not leave the result at the mercy of the subsequent stretching or further contraction of cicatricial bands; will entail no unnecessary removal of tissue; will not produce an ugly scar; and will not, if it happens to fail, render the patient's condition worse by making a second operation more difficult. He describes (*Ophthalmic Review*, vol. xiv., No. 170) the operation employed in nearly four hundred cases, with results "almost uniformly perfect."

An intermarginal incision is made along the whole border of the lid or beyond the part affected, all the cilia being included in the upper lip of the incision. This should be deep enough to allow the wound to gape easily about 3 mm. A strip of mucous membrane is then dissected from the lip, as long as the incision, and 2 or 3 mm. wide. From this strip all fat is removed. A suture with a large knot on it is drawn through one end of the strip from its external surface, and the needle passed into one end of the intermarginal cut and brought out through the skin of the lid at some distance—say 8 mm.—from the lid-border. The suture is then tied, care being taken to pull the strip well into the incision, and to leave an interval between where the suture comes out of the skin and the suture-knot to facilitate removal. The other end of the strip is similarly secured in the other end of the incision; and a third suture may be placed in the middle of the strip; although if the strip is stretched pretty tightly between the end-sutures, the third is not necessary.

For the same purpose F. C. Hotz (Chicago) prefers to take (*Jour. Am. Med. Assoc.*, vol. xxv., No. 16) a narrow strip of skin from behind the ear. This is made by an incision as long as the required graft and 1 mm. deep, and a second incision chiefly parallel to it 1.5 or 2 mm. distant from it, but joining the first at the ends and so inclined as also to meet the first at the proper depth throughout its length. The firm wedge-shaped graft thus obtained is trimmed, if necessary, to fit the incision, and pressed firmly into it.

The surface of the graft should be even with, or a little below, the edges of the wound; should never protrude beyond them. No suture is required

to hold this in place, and it only needs to be bandaged for twenty-four hours; after which it should be well lubricated with vaseline until in about two weeks it becomes smooth and scarcely distinguishable from the rest of the lid-border.

Migration of Subhyaloid Hemorrhage.

H. Friedenwald (Baltimore) reports (in the *Trans. of the Section on Ophthalmology of the Amer. Med. Assoc.*, 1895) a case of manifest disease of the retinal vessels, with repeated hemorrhages, subhyaloid, and into the vitreous. A large subhyaloid hemorrhage occurred in the upper part of the fundus. The next day it seemed to have changed position and an accurate drawing was made of it. Two days later it had migrated to a lower point and was lying directly over the macular reflex, and its lower edge was slightly concave and corresponded with the convexity of the upper margin of this reflex. Four days after this a small part of the hemorrhage remained at the upper margin of the macular, but the greater part had passed to the temporal side of the macular and beneath it, while between the two parts stretched a hemorrhagic line passing to the outer side of the macular and concave toward it. After this the bulk of the hemorrhage sank a little lower, and two weeks later it was principally absorbed.

Scopolamin Hydrochlorate as a Cycloplegic.

T. E. Murrell (St. Louis) has employed this drug for the purpose of paralyzing the accommodation for the measurement of ametropia, and is confident that so far it is the best cycloplegic that we have. He has employed it in fifty-seven cases (*Annals of Ophthalmology and Otology*, vol. iv., No. 4) in a solution of 1 : 1000, making two instillations at an interval of fifteen minutes, and has never had any evidence of a want of total suspension of the accommodation at the end of an hour from the first application. From such a use of the drug he has seen no systemic poisoning or local irritation. The accommodation is regained sufficiently to read in about seventy-two hours.

Formalin in Ophthalmic Practice.

Swan M. Burnett (Washington) calls attention (*Ophthalmic Record*, vol. v., No. 9) to the therapeutic value of this drug in ophthalmic medicine and surgery. It is a germicide of great power, it has little if any toxic properties, and it has the power of diffusing itself rapidly through the tissues. The latter quality gives it a great advantage over mercuric chloride, which by its coagulative action greatly limits its sphere of efficiency.

Burnett has obtained excellent results from its use in infecting ulcers of the cornea and purulent conjunctivitis. Corneal ulcers may be touched with a solution of 1 to 200 or 1 to 500 every day. For general use as an antiseptic collyrium a strength of 1 to 1000 or 1 to 2000 may be employed, although the stronger of these sometimes causes a slight burning sensation. For the disinfection of instruments and keeping them aseptic it has the advantage of not dulling the edges of knives.

Diffuse Sarcoma of the Choroid.

Mitvalsky (Prague) calls attention to the comparatively rare cases in which sarcoma of the choroid, instead of giving rise to a circumscribed tumor, extends with moderate thickening throughout a considerable part of that membrane, and he reports two cases (*Archives of Ophthalmology*, vol. xxiv., No. 4). He states that sarcoma may involve the entire uveal tract and yet never fill the interior of the eye, but may give rise to episcleral nodules.

In one of his cases a sarcoma with a history of two years' growth, involving the outer posterior portion of the choroid, had attained a thickness of but 1 mm., and the transition to normal choroid was very gradual. In another case arising in the macular region the thickness of but 1.5 mm. had been attained in three years and a half; but several secondary nodules had formed in the anterior portion of the retina. This case had been seen early and the diagonsis made of central choroiditis.

Oyster-shucker's Keratitis.

R. L. Randolph (Baltimore) has made a clinical and experimental study of the so-called oyster-shucker's keratitis, and reports his results in the *Johns Hopkins Hospital Bulletin*, Nos. 56 and 57. The affection is due to an injury to the cornea from a particle of oyster-shell, and is characterized by the rapidity with which an area of infiltration appears at the site of the wound. It is met with chiefly in the vicinity of Baltimore. This Randolph thinks is because elsewhere they do not follow the practice of striking the shell with a hammer, a practice apparently responsible for the injury. The particle is usually too small and light to penetrate deeply, and can seldom be detected. When it is heavy enough to pass through the cornea the eye is usually lost.

Bacteriological examinations and cultures from sixty-five cases yielded no constant, or generally present, pathogenic micro-organisms. The juice of the oyster mixed with clippings of the shell and filtered injected into the cornea and conjunctiva of the rabbit gave negative results. There were no reasons for supposing the keratitis due to some property peculiar to the oyster-shell of the Chesapeake Bay. Particles of shell sterilized by heat and introduced into the rabbit's cornea invariably produced an ulcer, which did not result from the introduction of other sterilized substances. Experiments with pure carbonate of lime (which constitutes 90 per cent. of the oyster-shell) produced in each instance a keratitis, and Randolph inclines to ascribe to it at least a share in the causation of the affection.

The treatment giving the best results includes: A compress-bandage, a mild sublimate solution, 1 to 4000, used every four hours, and an occasional drop of a 1 per cent. solution of atropin. To this treatment the keratitis promptly responds, and the patient can resume work in a week or ten days. Some opacity of the cornea is permanent.

Strychnine for Insufficiency of the Internal Recti Muscles.

In the *Transactions of the American Ophthalmological Society*, vol. vii., part ii., H. S. Oppenheimer (New York) reports twenty-eight cases of

exophorine, which he thinks prove that strychnine sulphate has a specific effect on the interni of the eye, toning them up especially, and far beyond the effect it has on the ocular muscles. The drug was given by the mouth three times daily, beginning with the dose of one-thirtieth of a grain, and increasing the dose gradually until in several cases one-eighth of a grain was taken.

OTOLOGY.

UNDER THE CHARGE OF

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Foreign Body in the Ear.

Böke records a case of fatal meningitis, set up by unskilful efforts at removal of a foreign substance from the ear of a child, three and one-half years old.—*Archiv f. Ohrenh.*, Bd. 40, p. 56.

If the average medical man would only remember that a simple substance which a child can slip into the external ear could be syringed out by anybody, how much trouble would be saved! Gentle measures always succeed, and rough ones never, while the latter always do harm and often cause death.

Objective Noise in the Ear.

Tomka reports the observations of an objective noise in the ear of a boy of six years, due, he thinks, to the contraction of the tensor veli muscle. —*Archiv f. Ohrenh.*, Bd. 40, p. 57.

Primary Carcinoma of the External Auditory Canal.

Krepuska records a case of carcinoma of the external auditory canal, which seemed to have originated in chronic eczema. Carcinomatous degeneration occurred partly in the excretory ducts and partly in the acini of the wax-glands, and extended to the terminus of the middle-ear.—*Archiv f. Ohrenh.*, Bd. 40, p. 56.

General Constitutional Treatment in Diseases of the Ear.

Gellé presented an exhaustive paper on this subject at the Fifth International Otological Congress, September, 1895.—*Journal of Laryngol., Rhinol., and Otol.*, November, 1895.

He said, among other things, that often the most important information the aurist can give is that the ear is quite normal in appearance, and that the physician must look elsewhere for the cause of constitutional disturbances, though in many cases he could trace them to disease of the organ of hearing.

In acute aural diseases occurring in the course of the eruptive or other fevers careful naso-pharyngeal treatment is recommended for their prevention, in particular Guye's method of naso-irrigation by means of a soda-water siphon-douche, and if necessary the removal of tonsils.

Deaf-muteness, he thought, might be prevented at times by prophylactic specific treatment of the mother during gestation, and by attention to the auditory organ of the infant.

Intestinal antisepsis should be maintained in all cases by means of calomel, naphtol, salol, and other drugs for preventing the multiplication of pathogenic microbes and the occurrence of septic infection. In acute otitis in general he administered sulphate of quinine, but when it arose from influenza he preferred antipyrine, and in gouty otitis the well-tried antiarthritic remedies. He had hopes of advantage accruing from the application of serum-therapeutics in infective diseases of the organ of hearing. In chronic otorrhœa he advocated more frequent recourse to antisyphilitic treatment, and attached great importance to general treatment in gouty, diabetic, and tubercular subjects, believing in a future for serum-treatment in the last. The removal of causes of weakness, such as prolonged lactation, is of urgent importance. The early administration of pilocarpine in sudden deafness was strongly advocated. Hypnotism, though occasionally of value in slight cases of functional deafness, had never proved of value in severe cases, and electricity was of limited value.

Ménière's Symptoms, or Phenomena.

Frankl-Hochwart,[1] Barr,[2] and Gruber[3] have been presenting the old subject of so-called Ménière's disease in a partially new dress. They unite in rejecting the term Ménière's disease as a general one, limiting its use to a particular form of "Ménière's symptom-group." This, however, is not new with them, as most aurists have long occupied this ground in nomenclature of this malady. Recognizing the fact that ear-vertigo (Ménière's symptoms) may be excited by irritation in either of the three divisions of the ear, the outer, middle, and inner, or even in the auditory nerve, we announced fourteen years ago that ear-vertigo should be named according to the seat of the irritation, the term Ménière's disease being reserved for ear-vertigo originating in disease of the internal ear.[4]

Tympanic vertigo is that form originating in tympanic disease, and is the most common form of aural vertigo, or Ménière's symptoms. By dividing the so-called Ménière's phenomena thus according to the seat of the irritation evoking them, they can be rationally considered and treated, and in no other way.

Otitic Facial Paralysis.

Trifiletti records a case of facial paralysis following inflammation in the ear, which seems to confirm the ideas of Lannois and Gellé that in every

[1] Der Ménièresche Symptomen-Complex, Wien, 1895. Alfred Hölder.
[2] British Medical Journal, December 28, 1895.
[3] Med. Press, London, January 8, 1896.
[4] Philadelphia Medical Times, June 3, 1882.

case of so-called facial paralysis from cold the middle ear will be found simultaneously inflamed, and that this is the real cause of the facial palsy.—*Annales des Mal. de l'Oreille*, January, 1896.

Passage of Suppuration of the Middle Ear to the Brain by way of the Carotid Canal.

Meier calls attention to the above way of infection of the brain from the ear, as already recorded by Koerner and others (*Arch. für Ohrenh.*, Bd. 38, and *Annales des Mal. de l'Oreille*, January, 1896). Inflammations of the brain thus excited do not differ from other forms.

Involuntary Opening of the Lateral Sinus.

Chincini reports four cases of involuntary opening of the lateral sinus during operations on the mastoid process (*Annales des Mal. de l'Oreille*, January, 1896). The hemorrhage was stopped by plugging with iodoform-gauze, over which was spread a sublimate-dressing. Recovery ensued in from six to ten weeks.

Spontaneous Rupture of the Mastoid Cells.

Bacon records the occurrence of spontaneous rupture of the mastoid cells in a girl two years old (*Annales des Maladies de l'Oreille*, January, 1896). According to our experience, most mastoid abscesses will thus relieve themselves in children and often in adults without any interference on the surgeon's part. If the primary otitis media is not secondarily infected by too much treatment through the external ear, there will be no mastoid sequelæ to contend with.

Abscess in the Temporal Lobe.

Zeller (*Archiv f. Ohrenh.*, vol. 40) reports three cases of the above-named disorder.

1. A child, two and one-half years old, after acute otitis scarlatinosa, presented swelling behind the right ear. Profound opening of this led to an extradural abscess. Four weeks later the first symptoms of brain-abscess appeared: weak voice, loss of appetite, twitching and paralysis of the left facial tract, vomiting, twitching in left arm and leg, and dilatation of the *left* pupil. Pulse finally reduced to 56. Rupture of abscess into ventricle before an operation was allowed.

2. A boy, thirteen years old, affected with multiple osteomyelitis; pulse 66, temperature normal. Left ear diseased; left eye normal; right pupil the wider. Face drawn toward the left side; right arm and leg paralyzed. Autopsy revealed a fetid abscess in the right temporal lobe, with rupture into the ventricles, and meningitis. Two small perforations in the tegmen tympani.

3. Woman, twenty-two years old, for twelve years the subject of chronic otitis suppurativa in the right ear. Staggering and falling with closed eyes, slight facial paralysis on the left side, and amblyopia. In seven weeks the symptoms grew worse; vomiting; temperature 100⅘°, and then below normal;

facial and hypoglossal paralysis; apathy; pulse 60 at times. An operation was performed in the middle fossa, and an abscess drained and tamponed. Subsequently sloughing of brain and meningitic symptoms. Death eight days later. Autopsy revealed softening about abscess and œdema of the rest of the temporal lobe, and pachy- and lepto-meningitic suppuration.

Sinus-phlebitis.

Böke reports a case of otitic sinus-phlebitis in which the mastoid was at no time sensitive to pressure, but in a line from behind the mastoid downward in the course of the sterno-cleido-mastoid muscle, as far as the clavicle, the lightest touch caused great pain. The jugular was distinctly felt, being as thick as the little finger. The autopsy revealed on the under surface of the right cerebellum a small abscess filled with brownish-gray pus, around which the white substance was softened. The tegmen tympani was intact, but the inner wall of the sigmoid fossa near the jugular foramen was eroded and perforated, the right sigmoid sinus partly destroyed and partly filled with broken-down brownish-red thrombi. Similar changes had occurred in the internal jugular vein. There were metastatic abscesses of the lungs, necrosis of the pleura, suppurative pleuritis on both sides, and parenchymatous degenerations of the liver and kidneys.—Hungarian Otol. Society, *Archiv f. Ohrenh.*, Bd. 40, p. 55.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Abscess of the Tonsil.

In an article on the etiology of abscess in the tonsil and the surrounding connective tissue Dr. Koehler, of Posen (*Deut. med. Woch.*, 1896, No. 7), reports, among others, one source which, it is believed, has been hitherto undescribed, namely, a chronic suppurative inflammation of the middle ear.

A well-nourished servant-girl, twenty-five years of age, came to Dr. Koehler June 26, 1895, complaining that she had an ulcer in the right tonsil again; and she stated that for a number of years such ulcers had recurred at intervals of from four to six weeks, and had continued even after an operation for removal of the greater portion of the tonsil. Examination showed an abscess in the substance of the right tonsil, which was at once opened. The left tonsil was free from plugs, the teeth were very sound, and there was no disease in the nasal passages. The left ear was normal, but the right ear contained fetid, thick pus proceeding from a chronic suppurative inflammation of the middle ear. On proper treatment

of the ear-trouble the abscesses ceased to recur, and three months later the patient stated that she still remained free from them.

The treatment showed that the exciting cause of the abscess had been the suppuration in the middle ear. The pus had flowed along the Eustachian tube back upon the pharynx, and had thus infected the tonsil.

A Fibroma of the Nasal Septum.

This case is unique both in its histological characteristics and in its seat, and equally so in the operation found necessary for its removal.

At a late meeting of the Laryngological Society of London (*Journal of Laryngology, Rhinology, and Otology*, 1896, No. 2), Mr. W. R. H. Stewart showed a large fibroma which had been removed from the nasal septum after a slightly modified Mansell-Mouillin operation upon the upper jaw of the left side, subsequent to a preliminary tracheotomy. This operation had been undertaken under the impression that the growth took its origin at the base of the skull, it having been found impossible to insinuate a wire between the tumor and the roof of the pharynx. After exposure, the tumor was pulled away with some difficulty, the posterior knob being firmly held by atmospheric pressure in a rounded hollow in the base of the skull. When fresh the growth measured $4 \times 2\frac{1}{2} \times 1\frac{5}{8}$ inches, and was found to have grown by a very small pedicle from a ridge of a much-distorted septum. The pedicle contained a piece of bone.

The patient was a man over fifty years of age, and had had a blow upon his nose forty-four years before. Twenty-five years ago his nose began to get blocked, and the case gradually grew from bad to worse, until complete blockage of both sides was established. The nose was considerably bulged on the left side. Examination revealed a large tumor projecting slightly from the anterior nares and filling up the rhino-pharynx.

A section from the centre of the growth showed it to be composed of a very dense white fibrous tissue, arranged as lobes growing from a less dense central hilum, which contained spicules of bone near the pedicle.

Tuberculous Infiltration of the Pharynx and Tongue.

At a meeting of the Laryngological Society of London (*Journal of Laryngology, Rhinology, and Otology*, No. 2, February, 1896) Dr. Clifford Beale showed specimens from cases of long-standing tuberculosis of the lungs. Ulceration had only appeared a few weeks before death, and seemed clinically to be only superficial in character. Careful microscopic examination by Dr. Hugh Walsham, however, proved that the infiltration extended deeply into the muscular layers, both in the pharynx and in the tongue. There had been remarkable enlargement of the papillæ of the dorsum of the tongue, but without apparent connection with the tuberculous infiltration. In one case the tonsil was found to be free from tuberculous infiltration, although it had been so long bathed during life in tuberculous débris from the ulcer.

At the same meeting Mr. De Santi showed pathological specimens of tuberculous ulceration of trachea, larynx, and pharynx from two patients.

Case I.—Male, aged twenty-eight years, began to get ill in October, 1894.

Voice lost early in October, 1895, when laryngoscopic inspection showed well-marked tuberculosis of the larynx. In the beginning of November an ulcer the size of a sixpenny-piece was noted in the posterior wall of the pharynx. The patient died November 20th.

At the post-mortem well-marked extensive phthisis and empyema were found, and well-marked tuberculous ulcers of the trachea and larynx in addition to the tuberculous ulcer in the posterior wall of the pharynx.

CASE II.—A man suffering from phthisis was operated upon in October for tuberculous disease of the right metatarso-phalangeal joint. His disease rapidly increased. In the beginning of November miliary tubercles were found on the soft palate, fauces, and pharnyx. After death the pharynx and fauces were found to be the seat of tuberculous infiltration and ulceration, and there was a small ulcer at the base of the left vocal band.

DR. DE HAVILLAND HALL stated that he had a similar case under his own care, and mentioned the rarity of having three cases of tubercular disease of the pharynx in one ward at the same time.

TOPICAL TREATMENT OF LARYNGEAL TUBERCULOSIS.

DR. A. KUTTNER, in a paper read before the Hufeland Society (*Berl. klin. Woch.*, 1896, No. 3), discusses the subject in a very conservative manner. While acknowledging that superficial ulcerations sometimes cicatrize thoroughly, and occasionally a deep ulcer also, he recognizes that this result in serious cases is so infrequent as to be out of all consideration as an argument in discrediting topical chirurgical measures. On the other hand, he says that considerable prolongation of life, and sometimes apparent, if not absolute, cure may be attained by such procedures.

One of the greatest difficulties to be encountered in tuberculosis of the larynx is the pain and difficulty in swallowing, which in some cases is so great as to disable the patient from taking nourishment or quenching thirst. In these cases, if diseased tissue can be removed in sufficient extent to enable the patient to resume his meals, a great deal of good results.

A few cases are mentioned from the doctor's own practice. One case of diffuse infiltration and ulceration was healed after splitting of the larynx and curettage, and has remained healed for four and a half years. Another case has remained healed for more than four years after a single curetting, following ineffectual treatment with lactic acid for months. A third patient in whom recurrence took place after curetting has remained cured for three years after use of the electric cautery. All these patients had been treated without effect with tuberculin under the typical reaction. Cases of similar character, but not so marked, are likewise mentioned.

The surgical processes discussed include incision, curettage, electro-cauterization, electrolysis, tracheotomy, laryngofissure, and resection of the larynx. In the presence of high fever, extensive implication of the lungs, and serious impairment of the patient's strength, none of these operations is justifiable, unless they happen to be indicated for the purpose of preventing immediate danger to life. Incision and curettage are indicated when there is a hopeful condition of the general system with rather circumscribed tuberculous disease in the larynx. Electric cautery is sometimes better even than curet-

tage. Larger tissues are better excised than burned away, but it has been found of great practical value to cauterize the field of operation and a little beyond it. The cicatrices thus secured by the burning are said to be firmer than those which follow incision. Tracheotomy is believed to be of service in procuring rest to the larynx from phonation and respiration, and saving it from the contact of secretions from the lungs and bronchi.

Laryngofissure is believed to be indicated in cases of extensive infiltration which are beyond the reach of instruments introduced by the natural passages. Everything that is diseased can be removed by direct access. Four cases are mentioned in which this practice was justifiable by the improvement which followed.

Extirpation of the larnyx is not considered justifiable; either the cartilages are intact, in which case laryngofissure answers every purpose, or else they are already diseased, and then there is very little hope of recovery.

Dr. Kuttner recommends treatment of tuberculosis in institutions devoted to the purpose, to which patients should be sent in their earliest possible stages, and he expressed the hope that such establishments will soon be furnished with assistants more able to carry out the procedures which he has discussed, before the morbid process in the larynx has become extensive.

An Improved Device for Correcting Certain Deformities of the Nose.

Dr. F. E. Hopkins describes and depicts (*New York Medical Journal*, June 8, 1895) a metallic bridge to correct a deformity of the nose whose supporting framework has been destroyed by accident or disease. It is made of platinum a fiftieth of an inch in thickness, and moulded to suit the individual. It has a pair of pointed arms to be set into openings drilled into the superior maxillary bone.

Dr. Hopkins states that by doing Rouge's operation ample room is secured to place the bridge properly, and that it is retained in position with surprisingly little irritation.

Suppurative Disease of the Accessory Sinuses of the Nose.

Dr. J. H. Bryan, of Washington, reported (*New York Medical Journal*, October 12, 1895) a number of cases at the last Congress of the American Laryngological Association. This paper is accompanied with an admirable series of illustrations to exhibit the anatomical relations of the sinuses, and the methods of obtaining access to them for diagnostic and operative purposes.

The Necessity of Tracheotomy in Bilateral Paralysis of the Crico-arytenoid Muscles (Abductor Paralysis).

A highly instructive case is reported by C. W. Hartwig, M.D., of Baltimore (*Presbyterian Eye, Ear, and Throat Charity Hospital Reports*, 1896, No. 1).

The patient was a colored man, thirty-two years of age, with labored respiration and well-marked inspiratory stridor on exertion. Laryngoscopic inspection revealed absolute paralysis of the left vocal band in abduction, and

almost complete paralysis of the right band. On inspiration the bands were brought in apposition, which completely closed the glottis, and on expiration they presented a vaulted appearance. Immediate tracheotomy was urged, but for some reason or other it was put off by the patient. On the fourth day of his admission into the hospital Dr. Hartwig was suddenly summoned by the nurse with the news that the man was dying, and the doctor found him throwing his arms in the air, gasping for breath, and unable to enunciate a syllable. Dr. Hartwig quickly secured a scalpel and a pair of scissors, and drawing the patient over the side of the bed plunged the knife into the trachea just below the isthmus, enlarged the incision with the scissors, then with his scissors and his finger separated the opening; turning the patient over on his side to prevent the blood, which had already become carbonized, from trickling down. Dr. Driver, who was assisting Dr. Hartwig, resorted to artificial respiration, after which the canula was inserted. The patient did well.

This case well illustrates the risk that is run when tracheotomy is delayed in cases of this kind. Such practice is reprehensible.

The compiler knows of cases in which the obstinacy of the attending physician has sacrificed lives which would have been saved had the consultant's advice been followed.

OBSTETRICS.

UNDER THE CHARGE OF

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Partial Abortion: Expulsion of the Amniotic Sac Alone.

In the *Edinburgh Medical Journal*, 1896, No. 488, Haultain reports a case of abortion supposed to be at the period of three months. The sac expelled was the size of a large orange, distended by amniotic liquid, and composed of the amnion only. In addition to this, he has noticed two other examples of the expulsion of the amniotic sac unruptured and without the chorion. In one of them the amount of amniotic liquid was unusually great. He describes one of his cases in detail as follows: The patient was aged thirty-seven years, and pregnant for the third time. After a few hours of abdominal pain and slight hemorrhage, she expelled a cyst the size of a goose-egg. When her physician arrived he found that all clots had been removed, and that the cyst only remained. There was but little hemorrhage, the os uteri was but slightly dilated, and uterine contractions had ceased. The natural inference was that abortion had been complete. For two weeks the patient did well, there being, however, an excessive watery vaginal discharge. After

the third week the patient lost blood also. She grew progressively weak, and six weeks after the abortion Haultain saw her in consultation. The uterus was considerably enlarged, and the os uteri but little dilated. After using Hégar's dilators, it was found that the uterine cavity was lined with decidua. This was removed with difficulty, and with considerable hemorrhage. The patient went on to recovery. On examining the tissue removed it was found to be composed of chorionic membrane adherent to the decidua, and rich in villi.

It is supposed in these cases that the embryo has previously perished, which renders the attachment of its membranes to the uterus a feeble one. In some of these cases the embryo has been absorbed before the amniotic sac is expelled; in others it was found present.

A Conservative Cæsarean Section for Eclampsia.

In the *Annali di Ostetricia e Ginecologia*, 1896, No. 1, Decio reports the case of a patient, seven months pregnant, suddenly taken with eclampsia, whose health before marriage had been excellent. She had suffered, however, from a gradual diminution in the secretion of urine and from disturbance of vision. Upon the advent of symptoms of eclampsia, she was taken at once to the hospital, and an effort made to dilate the mouth of the womb with Hégar's dilators. The fœtal heart beat could be heard, and was 120 to the minute. The patient was given a purgative enema, and morphine injected hypodermatically. On the following day the secretion of urine had increased in amount, but was highly albuminous, while the pulse had risen to 124. Hoping that delivery could be effected by the natural passages, the vagina was tamponed and chloral was given by rectal injection. The patient's condition, however, grew worse. Dilatation of the uterus proceeded very slowly, although the patient was anæsthetized by chloroform. When partial dilatation had been obtained an effort was made to perform version by Braxton-Hicks's method, with the hope of securing rapid delivery. This effort proving unsuccessful, the abdomen was opened and the fœtus delivered by Cæsarean section. Hemorrhage was readily controlled by an elastic ligature, and the uterus sutured, the abdomen sponged dry, and the abdominal wound closed. A rubber drainage-tube was inserted in the cervical canal. The uterus was made to contract by ergotin given hypodermatically, and the rubber tube was forced out of the uterus. The fœtus was dead, and showed signs of beginning maceration. The mother's urine was at first 55 per cent. albumin. Her condition, however, steadily improved, and she ultimately made a good recovery.

The Advantages of Symphysiotomy.

In the *Annales de Gynécologie*, 1896, vol. xlv., Queirel writes enthusiastically of the advantages of symphysiotomy. He describes the case of a primipara, aged forty-two years, who suffered from lingering labor, during which the physician in attendance made fruitless attempts to deliver with forceps. The patient had a contracted pelvis, which was not at first discovered. Queirel, when called in consultation, was obliged to deliver by

embryotomy, which was not difficult. The patient had become so exhausted that she died of shock a few hours afterward.

He also reports the case of a primipara with contracted pelvis in whom dilatation was slow, the bag of waters having ruptured prematurely. Dilatation was completed by Champétier's bag, but the head failing to descend, symphysiotomy was performed. A living child was born, mother and child making a good recovery.

He also describes the case of a patient upon whom fruitless efforts had been made to deliver with forceps, and who was admitted to the hospital with a ruptured uterus. He calls attention to the unnecessary loss of life for mother and child in cases in which symphysiotomy, performed under modern surgical precautions, would have saved both lives.

The Effect of Symphysiotomy in Permanently Enlarging the Pelvis.

In the *Centralblatt für Gynäkologie*, 1896, No. 4, Woyer describes the case of a patient who had lost one child by forceps-delivery, and had borne another spontaneously. In her third pregnancy she entered Schauta's clinic in Vienna, where it was found that she had a contracted pelvis of the flat rhachitic type. Under strong pains the head engaged with the occiput directed behind. It failed to descend, and a contraction-ring gradually formed. An effort was made to deliver with forceps, which proved unsuccessful, and symphysiotomy was performed. The symphysis was brought together with silver wire, mother and child making a good recovery. This patient subsequently became again pregnant, and entered the clinic for confinement. It was found that the rhachitic type of pelvis, as shown by the previous measurements, had been replaced by a normal pelvis. Birth proceeded spontaneously without difficulty. During labor, the finger was placed against the symphysis and the pelvimeter applied between the crests of the ilia. By neither could any stretching of the pelvis be discerned. The child was born living, and mother and child made a good recovery.

Pregnancy and Labor in Cases in which Suspension of the Uterus had been Previously Performed.

One of the most interesting and important contributions to this subject is the paper by Strassmann (*Archiv für Gynäkologie*, 1896, Band l., Heft 3). He writes from the Polyclinic of the Charité in Berlin. Three methods of suspending the uterus by operative procedure are recognized: one in which the uterus is suspended by shortening the round ligaments, a second by joining the uterus to the anterior wall of the abdomen, and the third by uniting the womb to the bladder, or to the anterior wall of the vagina. So far as the results of pregnancy go, in cases operated upon by these different methods, shortening the round ligaments would seem to give the best results, with the least inferference with the natural mobility of the uterus during pregnancy and labor. The number of abortions occurring in these patients is also very small, and no case is found upon record in which at labor serious complication have arisen. Pregnancy seems to occur as frequently as is normal after this operation.

Of the various methods of suspending the uterus to the anterior wall of the abdomen, that of Czerny and Leopold seems best, because by this method the stitches are removed and the uterus is left more mobile than in cases in which the sutures are retained. Pregnancy frequently occurs after this operation, and the number of abortions is not noticeably great.

In reviewing cases in which difficulty has occurred at labor after suspension of the uterus Strassmann calls attention to Goubaroff's case, in which a living child was delivered by Cæsarean section, efforts at external version having failed and it being impossible to dilate the mouth of the uterus. It was feared to make pronounced efforts at version because the posterior wall of the uterus was very greatly dilated and threatened rupture. Strassmann reports the case of a multipara, aged thirty-six years, whose uterus had been suspended to the abdominal wound with catgut sutures in an abdominal section by which an ovarian cyst upon one side had been removed. When labor came on the tissues at the site of the original scar were very much drawn in, while the descent of the child seemed hindered by the lack of mobility in the uterus. Not much difficulty was experienced in extracting a living child with forceps. Free hemorrhage occurred after the delivery of the child, which was only checked by carrying the uterus strongly downward into the brim of the pelvis, and by placing a compress above the uterus with an abdominal binder. It was observed in this case that the adhesion between the uterus and the abdominal wall stretched readily, and that the fundus and posterior wall of the uterus were also adherent. It was observed that adhesions between serous surfaces permitted the greatest elasticity during labor, and gave the best results in delivery.

When, however, the uterus is attached to the wall of the vagina, the adhesion is by connective tissue, and a firm and unelastic scar develops. Unless the posterior wall of the uterus distends greatly during pregnancy, abortion is inevitable. Dührssen finds that in cases becoming pregnant after this operation 25 per cent. aborted. Of patients treated for retrodisplacements with pessaries, but $16\frac{6}{10}$ per cent. aborted, while of patients treated by fixation of the uterus to the vagina $27\frac{2}{10}$ per cent. aborted. If retroversion of the uterus be compared with other diseases of the uterus, it is found that retroversion offers the least obstacle to conception. It is possible for the uterus to become separated from the vagina during pregnancy. If it does not, the uterus must become greatly distended in its posterior wall.

Strassmann describes two cases of labor in patients in whom the uterus had been attached to the anterior wall of the vagina. In the first case the cord prolapsed, the mouth of the womb was drawn upward and backward, while the anterior wall of the vagina was forced downward and very greatly distended. In this sac lay the right shoulder and arm. A difficult version made possible the delivery of the child, followed by severe hemorrhage. In this case, as retraction of the uterus did not take place, it was necessary to carry it down into the pelvis, and to retain it there by a pad and bandage. The patient made a good recovery.

The second case reported is that of a patient from whose uterus a small fibroid had been removed, and the womb attached to the anterior wall of the vagina. At labor it was found that it was very difficult to empty the bladder the mouth of the womb was drawn very strongly upward and backward, the

child being in shoulder presentation. Although dilatation was advanced by elastic dilators, it was impossible to make version because of the danger of rupturing the uterus. An eclamptic attack supervened, and tetanus of the uterus gradually developed. The anterior vaginal wall formed a sac or pocket, and the posterior wall and posterior portion of the lower uterine segment were greatly distended. Under anæsthesia it was found impossible to perform version or craniotomy. Abdominal section was accordingly done, the uterus amputated, and the stump fastened to the abdominal wound. The patient died of shock. On post-mortem examination a laceration of the vagina was found between the anterior lip of the uterus and the point of fixation of the fundus. Some hemorrhage had occurred from the region of the right broad ligament into the abdominal cavity.

In view of the complications arising at labor Strassmann would limit suspension of the uterus to Alexander's operation, or to ventro-suspension by bringing together serous surfaces and removing the stitches. In view of the fact that many cases can be cured by pessaries and other methods of treatment, he would avoid, if possible, suspension of the uterus in women who are likely to bear children.

The Course of Pregnancy and Labor in Cases in which the Uterus has been Fixed to the Vagina.

Among the many recent contributions to the literature of this subject is that of Werthein (*Centralblatt für Gynäkologie*, 1896, No. 2). He found that out of thirty-seven cases of vaginal fixation of the uterus three had subsequently become pregnant. One of these terminated in abortion at four months, another in normal labor after a normal pregnancy. The third patient was one in whom the tissue between the bladder and the uterus had been opened, and the uterus had been directly united with the vagina. Before the pregnancy the fixation of the uterus was a remarkably firm one. As pregnancy progressed the vagina was drawn up with the growing uterus, forming a diamond-shaped area, accompanied by the gradual ascent of the vaginal portion of the cervix. Fearing complicated labor, the patient was instructed to enter the clinic upon the onset of labor. Upon examination, the fœtus was found in transverse position, the head upon the right, the fœtal heart-sounds near the umbilicus. The anterior wall of the vagina was drawn up behind the symphysis so that the scar could scarcely be felt. The cervix was so high that it was necessary to introduce the entire hand to reach it. The anterior lip of the cervix was thickened, the posterior lip very much thinned. But little of the uterus remained within the pelvis. The round ligaments on both sides could plainly be felt converging toward the middle line at the region of the umbilicus. The patient was a multipara, and had strong labor-pains, in spite of which the birth did not advance. The cervix dilated very slowly, the anterior wall of the uterus being drawn down above the symphysis. It was necessary to hasten labor on account of the great distention of the posterior wall of the uterus, which threatened rupture. Under deep anæsthesia combined version was performed and a foot drawn down. Three hours afterward a living child was delivered. Immediately after labor the uterus was examined by the hand; the thinning of the posterior wall of

the womb was very remarkable, and the vagina seemed to pass into the uterus without appreciable distinction. The patient made an uninterrupted recovery. On examination afterward the attachment of the uterus to the anterior vaginal wall was found in no way weakened.

Ferripyrin, a New Hæmostatic for Obstetric Use.

Schaeffer (*Centralblatt für Gynäkologie*, 1896, No. 2) draws attention to the following advantages which he claims for this substance in obstetric practice. Where escharotic effect is not desired, a 16 to 18 per cent. watery solution of ferripyrin may be used to advantage to check hemorrhage. In vaginal douches this substance is also very useful, and in solutions of 1 to 1½ per cent., by irrigation or with tampons, it tends to lessen pain. In powder it may be applied to cancer to lessen hemorrhage and allay pain, with great success. It may be used for this purpose upon gauze. In cases of hæmaturia it is equally valuable. It may also be given by the mouth for hemorrhagic conditions in adults, and in children, with excellent results.

GYNECOLOGY.

UNDER THE CHARGE OF

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Sympathetic Ganglion in the Ovary.

Elizabeth Winterhalter (*Archiv für Gynäkologie*, Band li., Heft 1), as the result of a careful study of the ultimate terminations of nerve-fibres in the ovary, concludes that the ovarian vessels are surrounded by nerve-plexuses, and that a ganglion is situated within the zona vasculosa, which contains cells similar to those of the sympathetic ganglia. Processes from this ganglion anastomose with the perivascular plexuses.

Exner's researches seem to show that ganglion-cells receive and store up impulses transmitted to them, to discharge these again as soon as the stimulus has reached a certain height. A ganglionic system may be interposed between sensory and motor terminal fibres, as in that between the follicular layer and medullary vessels of the ovary. This would appear to throw some light upon the causal relation between the ripening of a follicle and ovulation and menstruation.

Pflüger inferred that the growth of the former caused a constantly increasing irritation of the nerves of the ovary, which at its height gave rise to a centripetal impulse, inducing in its turn arterial congestion of the pelvic organs. According to the present theory, it is not necessary to suppose that the spinal centre is affected, the ovarian ganglion being the immediate reflex centre in which are accumulated impulses due to the pressure of the ripening ovisac. These which culminate and are discharged along motor fibres to the

perivascular plexuses of the ovary and then to the similar plexuses of the entire genital tract are reinforced, possibly, by a further reflex action on the part of Frankenhaüser's cervical ganglion. Hence a periodical increase in the amount of blood supplied to the uterus, with the resulting phenomena of menstruation.

Fibro-sarcoma of the Ovary.

Krukenberg (*Archiv für Gynäkologie*, Band l., Heft 2) reports five cases of solid tumor of the ovary, which presented histologically a mixed structure, partly fibro- and myxo-sarcoma and partly scirrhous carcinoma. These neoplasms, he states, are always bilateral, occur in young as well as in old subjects, and grow slowly, ascites being usually present. The entire ovary is affected, but maintains its usual form even when much enlarged, although the surface becomes more or less nodular. On section they show a firm, homogeneous structure with myxomatous softening in the interior; cysts may result either from the latter cause or from the dilatation of follicles. Histologically they present more or less marked hyperplasia of the ovarian connective tissue, and may be characterized as fibro-sarcomata, rich in cell-elements, and with a tendency to mucoid degeneration, hence the appropriateness of the term *fibro-sarcoma ovarii muco-cellulare carcinomatodes*, the latter being added in view of the fact that they develop metastases of the epithelial variety, and are quite malignant. Although these growths may remain stationary for a long period, they have a marked tendency to become disseminated through the lymphatics, first within those of the ovary itself, then in the vessels of the tube and corresponding broad ligament, and often in distant parts of the body.

Inversion of the Non-puerperal Uterus.

Holländer (*Deutsche med. Wochenschrift*, 1896, No. 10) reports the case of a patient, aged forty years, who was brought to the hospital in collapse, with profuse hemorrhage, which had begun suddenly a short time before, simultaneously with the sudden appearance of a mass at the introitus. On examination the uterus was found to be completely inverted, a small fibroid being attached near the fundus. The tumor was enucleated, but it was impossible to reduce the uterus after efforts had been continued for a month, and finally the organ was removed *per vaginam*, the patient making a good recovery.

The writer cites the case as a strong argument against the theory of inversion supported by Schauta, that it is due to relaxation of the uterine muscle rather than to active contractions. In this instance the muscle was quite normal; there was no prolapsus or increased abdominal pressure, the accident being preceded by painful contractions similar to those of labor, which were entirely out of proportion to the size of the tumor which the uterus was attempting to expel. The neoplasm being situated centrally, with a broad base, it was inferred that contraction took place most forcibly at the fundus and pressed it straight downward through the os internum until inversion took place. Under these circumstances operative interference would seem to be at once indicated in contrast with cases in which inversion is due to relaxation of the uterus.

Extirpation of Carcinoma of the Vagina.

Friedl (*Wiener klin. Wochenschrift*, 1896, No. 3) states that primary cancer of the vagina is not so rare as is supposed, upward of 130 cases having been recorded. The circumscribed, papillary variety offers the best prospects for operative interference, and is situated most frequently on the posterior wall.

Olshausen recommended attacking the growth through the perineal incision.

Dührssen adopts the same method, extending the cut from the vagina to the tuber ischii through the levator, and also making a parasacral incision, removing healthy tissue at a considerable distance from the growth. The writer reports two cases in which Forggler combined these methods with goodresults.

Influence of Fibro-myomata on their Environment.

Fabricius (abstract of monograph in *St. Petersburger med. Wochenschrift*, 1895, No. 36) discusses at length the various complications due to the presence of uterine fibro-myomata, especially the circulatory disturbances, hemorrhoids, thrombosis, and embolism of the vessels of the lower extremities. Pressure on the bladder and ureters and secondary hydronephrosis may occur. With rapidly growing tumors brain-atrophy and fatty degeneration of the heart are not uncommon In forty-two specimens of tubes removed with fibroid uteri the former were diseased in all but sixteen cases, simple salpingitis, with thickening of the muscular tissue, being most common.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Identification of the Typhoid Bacillus.

The many difficulties attending the separation of the typhoid bacillus from other closely allied species are familiar to everyone who has undertaken its detection in feces in cases of suspected typhoid fever, or who has attempted to cultivate it from infected water-supplies, milk, etc. In the examinations of feces it is the rapidly growing colon-bacillus which is the chief disturbing influence; in water and in the soil there are a number of forms as yet only imperfectly studied which present many of the same characters as the typhoid bacillus and are difficult of distinction from it.

Meeting with this difficulty in connection with the study of several bacteria separated from various sources (earth, water, feces, etc.), Loesener has made a most painstaking study of the literature with a view to determine the distinctive features of the typhoid bacillus (*Arbeiten aus dem Kaiserlichen*

Gesundheitsamte, xi., 207. Cf. *Fortschritte der Medicin*, 1896, xiv., No. 4, 150). His conclusions sum up the results of 689 separate articles in so far as they bear upon the cultural characteristics of the germ.

Ten characters are given as at present distinctive of the typhoid bacillus:

1. The appearance of the superficial colonies in gelatin plates.
2. The very active motility.
3. The large number of flagella originating from all parts of the bacilli.
4. Decoloration by Gram's method.
5. Growth in media containing grape-, milk-, and cane-sugar without gas-formation.
6. Growth in milk without causing its coagulation.
7. Growth in proteid-containing media without generation of indol.
8. Production of acid when grown in whey, but not in excess of 3 per cent., as tested by one-tenth normal soda-solution.
9. The growth on potato. This should be identical with that of a known culture of the typhoid bacillus planted simultaneously in parallel streak upon the same potato.
10. The failure to grow in Maassen's normal solution with glycerin.[1]

In the identification of the typhoid bacillus no one of these characters is alone sufficient; when all are present the evidence of the presence of that germ may be said to be very strong. Nevertheless, in his investigation, Loesener felt some doubt as to the identity of bacilli obtained from five different sources, all of which possessed all the characters above enumerated, since only two of them, upon being subjected to Pfeiffer's serum-test, corresponded in that also to the typhoid bacillus.

Loesener's conclusion is, then, that as yet we have no positive means of identification of the typhoid bacillus in cultures. His article is followed by a very extensive bibliography.

The Pfeiffer serum-test above referred to deserves brief mention, because if further confirmed it will afford a valuable ultimate test in doubtful cases, though it can hardly have a very wide usefulness, as it presupposes that the investigator have ready at hand blood-serum of an animal made immune to the toxin of the typhoid bacillus. As yet only a preliminary communication of this test has been published (*Deutsche medicinische Wochenschrift*, 1894, No. 48, 898), though it is referred to by a number of writers in such a way as to make it appear that it has already had quite an extensive use.

According to Pfeiffer, the poison of the typhoid bacillus is intimately connected with the bodies of the bacteria, and, though very unstable, remains potent after they have been killed by the vapor of chloroform or by heating for an hour at 59° C. The fatal dose of this toxin is from 3 to 4 milligrammes for every 100 grammes weight of animal. But by the use of smaller doses he was able to induce immunity, and in the blood of such immune animals antitoxins were discovered having decided bactericidal properties as regards the typhoid bacillus, but devoid of any such action upon the colon-bacillus and other allied forms. These antitoxins are also found in the blood of convalescents from typhoid fever.

The test, then, proposed by Pfeiffer is the inoculation of animals susceptible

[1] A proteid-free solution of malic acid, asparagin and basic sulphates, phosphates, chlorides, and carbonates.

to the toxin of the typhoid bacillus with a mixture of the suspected culture and the serum of an immune animal. If it be the typhoid bacillus, it will have been made innocuous by the antitoxins of the serum, and no pathogenic effect will result; but if it be any other species, the inoculation will be followed by the result characteristic of that species, as if the serum had not been used. In inoculated mixtures of the typhoid bacilli and the antitoxins the bacilli are said to disintegrate rapidly and disappear.

In view of the complexity of this subject and the uncertainty of all the tests of the identity of the typhoid bacillus which had been proposed, ELSNER undertook an extended experimental investigation of the growth of the bacillus on a very large number of culture-media of different sorts, introducing into their composition all manner of chemicals, animal and vegetable extracts, etc., in the hope of discovering some medium which would afford a differential test (*Zeitschrift für Hygiene u. Infectionskrankheiten*, 1895, xxi. 25). His work was most exhaustive and painstaking, and as its result he offers a new culture-medium upon which the typhoid and colon-bacillus grow readily, but which appears to support the growth of very few, if any, other forms which are met with in feces and in water.

The medium in question is Holz's[1] acid potato-gelatin containing 1 per cent of potassium iodide.

With this medium Elsner has examined sewage, water, feces, soil, etc., from many different sources with which the typhoid bacilli were mixed artificially, in order to determine whether by its use the bacilli could be detected in such menstrua, and with the most gratifying results. It was possible to detect the typhoid bacillus in water in which it was 8000 million times diluted. In feces the colon-bacillus alone grew as a contamination, but its colonies were very readily distinguishable from those of the typhoid bacillus. Thus in twenty-four hours the colonies of the *bacillus coli communis* were well developed and of characteristic appearance, while those of the typhoid bacillus were still invisible to the naked eye, appearing only as minute spots under the microscope. At the expiration of the second day the typhoid colonies were evident as a second crop of characteristic appearance. They are described as small and shining, resembling minute droplets of water, and are finely granular. The colonies of the colon-bacillus are large, coarsely granular, and have a brownish color.

With the assistance of Kolle thirty different cultures of the typhoid and colon-bacilli obtained by this method from various sources were subjected to Pfeiffer's serum-test, and in all cases the differentiation obtained by the new culture-medium was confirmed.

Of seventeen cases of typhoid fever investigated the specific bacilli were cultivated from the feces in fifteen, representing all stages of the disease from the seventh day to the sixth week.

[1] Holz's acid potato-gelatin is made as follows: 500 grammes of cleaned, pealed potatoes are ground into fine pulp on an ordinary grater, are covered with a litre of water and allowed to stand in a cool place for twenty-four hours. The extract is then strained off, 100 grammes of gelatin are added and the whole is boiled and filtered. The resultant medium has a brownish color and should be perfectly clear. Its acidity is usually such as to require from 2.5 to 3 c. c. of one-tenth normal soda-solution for the neutralization of 10 c. c. of the medium. If greater, it should be brought within these limits by the addition of an alkali. Cf. F. Holz: Zeitschrift f. Hygiene, viii. 143.

These results of Elsner, though published so recently as December of last year, have already received confirmation from two sources.

At the suggestion of Professor Renoers, LAZARUS undertook the examination of the stools of the typhoid fever patients in the Moabit Hospital in Berlin (*Berliner klinische Wochenschrift*, 1895, No. 49, 1068).

Twenty-one patients were thus examined. Of these five were well-marked cases in the first to the third week of the disease; the remaining sixteen were convalescents who had been without fever for some time. In all five of the active cases the typhoid bacilli were repeatedly separated from the stools in cultures by Elsner's method after forty-eight hours' growth (in one case after three days), and were readily obtained in pure culture from the first plates. One case was of unusual interest, in that on the occurrence of a relapse in the eighth week of the disease the bacilli reappeared in the stools after having been absent for some time.

Of the sixteen convalescents, in whom defervescence had occurred from three days to six weeks before the examination, in three only were typhoid bacilli detected, but in these repeatedly, though there appeared to be no disturbance of the alimentary tract, the stools being of normal consistence.

Lazarus adds nothing to the description of the method as given by Elsner, but he lays much stress on the importance of having the plates thinly sown, as otherwise the growth of the colon-bacillus may be inhibited and the differences between its colonies and those of the typhoid bacillus less marked in consequence.

In all of Lazarus's positive cases the identity of the typhoid bacillus was substantiated by comparative cultures with undoubted typhoid bacilli, and in one case the cultures were also subjected to Pfeiffer's test.

Similar success has attended examinations made by Brieger (*Deutsche medicinische Wochenschrift*, 1895, No. 50, 835) at the Institut für Infectionskrankheiten. Eleven cases only were examined, but in all the typhoid bacillus was detected without difficulty.

Case VII. is of particular interest, since, with the exception of slight fever and malaise, none of the usual symptoms of typhoid fever was present. The patient presented himself at the hospital, complaining of having felt miserable for the preceding two weeks. His mind was clear; there was neither roseola nor enlargement of the spleen, and Ehrlich's diazo-reaction was not given by the urine. From the beginning the bowels were obstinately constipated. Examination of the stools on two occasions, at an interval of five days, gave typical cultures of the typhoid bacillus, and the diagnosis was later confirmed by the fact that the patient's blood showed distinct immunizing power when tested with cultures of the typhoid bacillus.

Brieger very properly emphasizes this case as illustrative of the value of Elsner's test in fixing the diagnosis in ambulatory cases of the disease, in which neglect of proper precautions may lead to most unfortunate results both to the patient and, by increasing the liability of infection, to others.

The remaining ten cases presented well-marked symptoms of typhoid fever, and, so long as the fever persisted, the bacilli were abundant in the stools. The rapidity of their disappearance after cessation of the fever would appear to vary greatly, and Brieger draws attention to the necessity of great care to avoid a relapse in cases in which they persist in large numbers for any con-

siderable time after defervescence. He also suggests examination of the stools of attendants upon typhoid-fever patients and of others who have been exposed to infection, in the belief that if detected early the disease might often be aborted by free purgation with calomel.

Brieger further believes that Elsner's method has opened the way for a much better understanding of the habitat and mode of dissemination of the typhoid bacillus outside the body. An investigation of this subject by Elsner is already in progress.

The Etiology of Pneumothorax without Perforation of the Lung.

The possibility of the occurrence of pneumothorax without perforation of the lung, as the result of putrefaction of a pleuritic exudate with gas-formation, was suggested by Laennec, but has always been regarded with suspicion.

The recent bacterial examination of the exudate from a case of pneumothorax, in which neither perforation of the lung nor any cicatrix of the pleura could be discovered, has demonstrated the truth of Laennec's contention, and shows how important careful examination of the pleural contents may be in such cases in determining the diagnosis.

The case is reported by Levy (*Archiv f. exper. Pathologie und Pharmakologie*, 1895, xxxv. p. 335). As far as physical signs went the case was an ordinary one of hydro-pneumothorax, later developing into empyema, and leading to the patient's death in spite of operative evacuation of the pus. Fortunately anaërobic plates were made and led to the discovery of a thick, short bacillus, with rounded ends, growing best in 2 per cent. sugar-agar at the body-temperature, and its growth giving rise to abundant gas-formation. Animal inoculations demonstrated its pathogenic quality and the association of gas-production with its growth in the tissues.

As this germ was separated in pure culture, Levy has no hesitation in ascribing to it the gas formed in the pleural cavity of his patient, and he in addition emphasizes the importance of making routine examinations for anaërobic bacteria in all cases in which a thorough bacterial examination is desired.

Closure of the Coronary Arteries.

The frequent association of coronary disease with sudden stoppage of the heart's action has long been recognized, but much doubt has existed as to the precise reason for this result and as to the relative importance in its production of the different branches of the coronary arteries. In the hope of answering these and other questions of less pathological moment, Porter (*Journal of Experimental Medicine*, 1896, i., No. 1, 46) has carried out an exhaustive experimental investigation of the effect of mechanical closure of the coronary arteries of dogs. The details of his experiments are too numerous for reproduction here, but his conclusions may be briefly summarized.

Complete closure of all the coronary arteries was in every case speedily followed by complete arrest of the heart-beat. This result was less constant when only one of the branches was occluded, the frequency of arrest being directly proportional to the size of the vessel occluded. Thus, of sixty-seven

experiments upon this point, arrest followed ligation of the ramus circumplexus in 64 per cent. of the cases, of the ramus descendens in 28 per cent., of the coronaria dextra in 14 per cent., and was not observed at all after closure of the branch to the septum.

That the stoppage of the heart is not the result of mechanical violence incidental to the ligation was shown in a number of ways, notably by the fact that it occurred as frequently when no injury was inflicted, closure of the vessels being obtained by the introduction of a glass rod into the coronary artery through the innominate artery and the sinus of Valsalva. And it was also noticeable that the frequency of arrest after ligation was *inversely* proportional to the amount of destruction of the heart-muscle, the circumplex branch being that most readily ligated.

In all cases in which arrest finally occurred there was distinct diminution in the blood-pressure, almost immediately following the operation, the heart quickly became engorged with blood, and within a very short time fibrillary contractions of the heart-muscle were observed, which persisted often for some time after complete cessation of any co-ordinate beat. These are believed by Porter to depend upon the persistence of a certain degree of contractility in the muscle-fibres after loss of the power of co-ordination by the more highly organized nervous mechanism.

The whole effect of closure of the coronary arteries is attributed to anæmia, the various branches of the coronary arteries being physiologically, if not anatomically, terminal arteries. It is an interesting fact that in several of the experiments removal of the obstruction to the coronary circulation and emptying of the engorged heart by rhythmical massage were quickly followed by return of the normal heart-action.

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